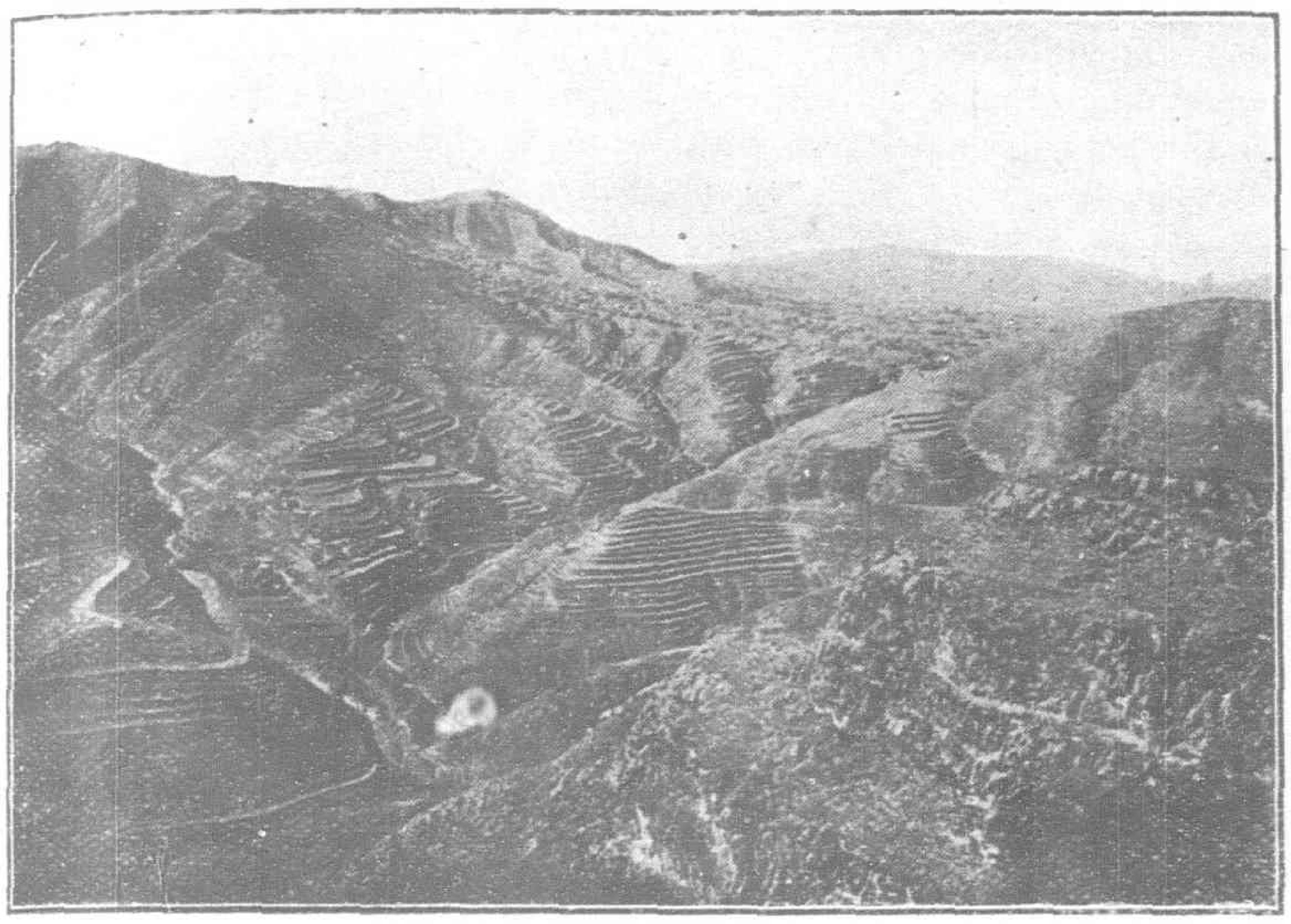
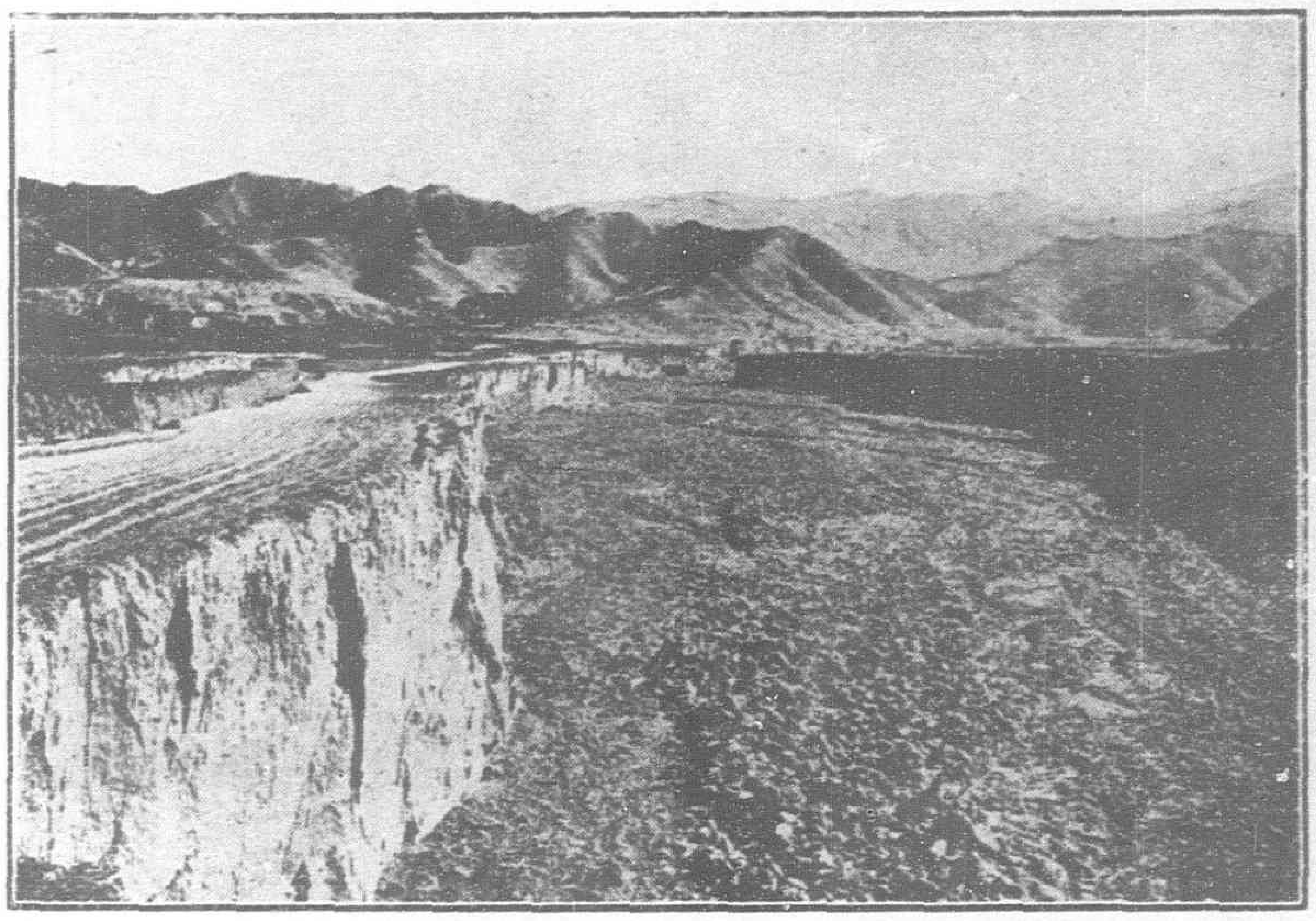
The Far Eastern Review

ENGINEERING FINANCE COMMERCE

VOL. XIV SHANGHAI, DECEMBER, 1918 No. 12



SAVING WHAT IS LEFT WHEN THE FORESTS ARE GONE. ARTIFICIAL TERRACING, AT WUTAISHAN, SHANSI PROVINCE.



DEFORESTED MOUNTAINS, SHOWING ARTIFICIAL TERRACING. WASH IN FOREGROUND. SHANSI PROVINCE.

The Relation of Forests to Floods

By D. Y. Lin, M. F., Author of "Elements of Forestry," "China and Forestry," etc., and Professor of Forestry, University of Nanking

Nowadays no excuse is needed for treating on the subject of floods. China, the Celestial land, may well be called the land of floods. Just at this time we have floods in Hunan, where the Governor superstitiously gave out orders to stop the killing of pigs and cows in order to stop the rise of flood waters; floods in Kwangtung, where the Central Government made a grant of $100,000; and floods in Honan, Shantung and Manchuria, where enormous sums of money have been spent in relieving the sufferers. The great Anhwei flood of 1911 resulted in the organization of the China Famine Relief Committee and the Colonization Association; the Canton flood of 1915 gave rise to the establishment of the Bureau of Conservancy Works, with Admiral Tang Hsia-heng as Director; and the so-called phenomenal flood we had in Chihli last year resulted in the organization of the General Flood Relief Committee, with Ex-Premier Hsiung Hsi-ling as Director-General. In Shanghai, Tientsin, and other important cities more than half-a-dozen "hui," or societies, were started as the result of these big floods, and it is the duty of these "hui" just to raise money for the sufferers and no more.

When we come to think of all these committees, bureaus, "hui," and what not, organized as results of the various floods, we cannot but infer that something *has* been done to try to solve the problem of floods in China. We read of the wonderful reports published by different committees about the flooded areas, and of the vast amount of money and food distributed among the homeless and starving people; but outside of these well-written reports and distribution of alms has there been anything *actually* done by these organizations to solve the flood problem? The answer to this question is: Yes, but very little. This, however, is to be expected because of the unsettled state of affairs in China, and, also, because of the lack of some form of concerted public action on the part of foreign and Chinese workers who have labored so assiduously to improve the hydraulic conditions of this country.

The Flood Problem

The problem of floods in China has been quite thoroughly analyzed and discussed during the last few years by engineers. Popular opinion has been that the flood problem is entireley an engineering one. I wish, however, to bring out in the following paragraphs the forestry side of the question, which, in the opinion of a few, has not been given proper emphasis in the discussions hitherto published. I wish to say at the outset that in a country like China, where there are hundreds of millions of acres of mountainous land, afforestation and reforestation cannot but exert an enormous influence on the control of floods.

Forest Influence

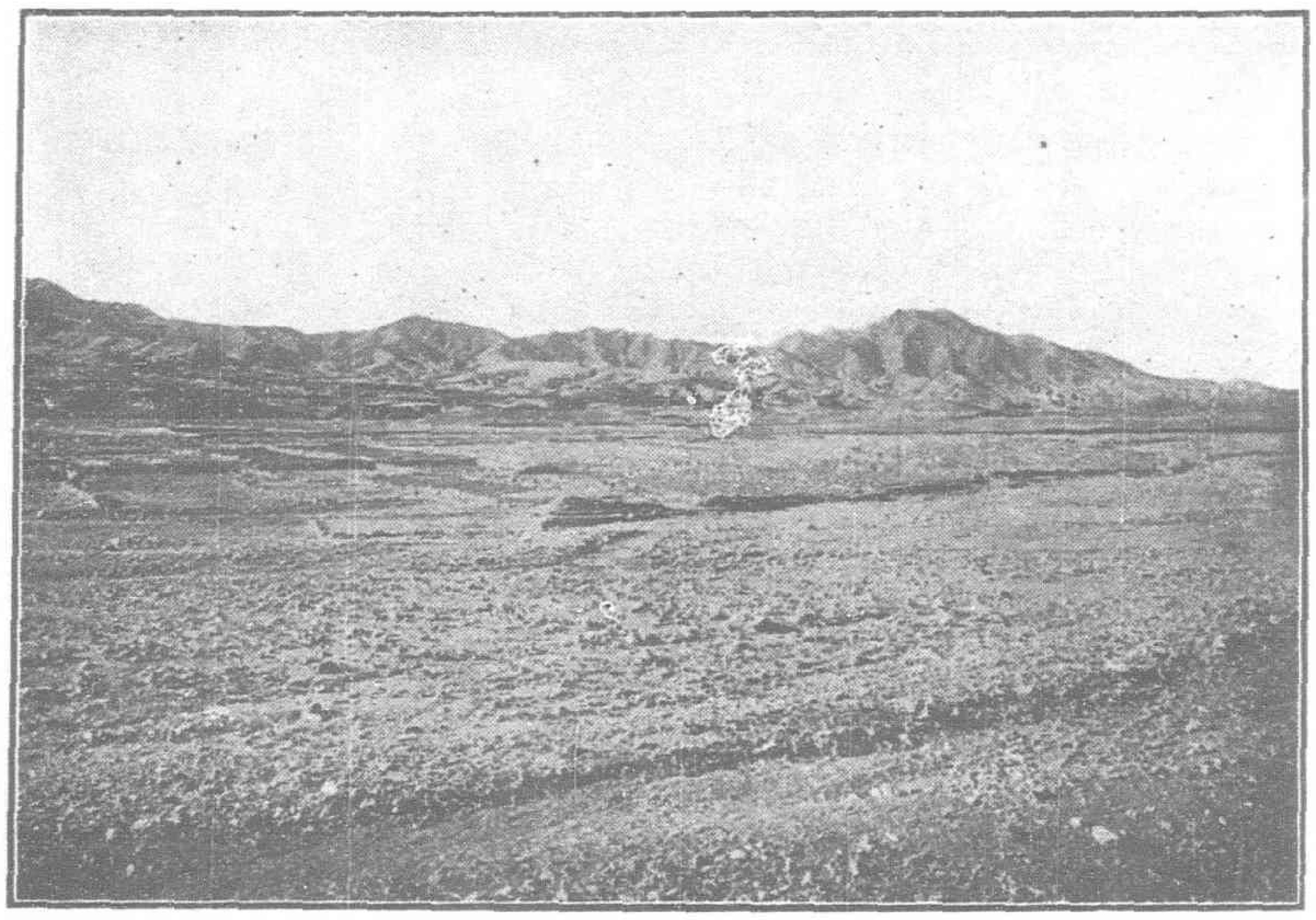
In order to understand exactly the relation of forests to floods, it is important that we first consider the influence of forests on watersheds and the conditions they create with regard to surface run-off, evaporation, soil erosion, absorptive capacity of soil cover, underground seepage, and streamflow.

Surface run-off.—In the mountains the greatest loss of rain water is through surface run-off, and a forest cover has the most important influence in reducing this. According to investigations made by the United States Forest Service, the amount of water which the forest cover saves to the soil by reducing the surface run-off and changing it to underground seepage is as follows: For forests at low altitudes, where the rains are not heavy and the soil is less subject to freezing, twenty per cent; for forests of moderate altitudes, thirty-five per cent., and for mountain forests, fifty per cent. of the precipitation.

The reasons why the forest is able to check surface run-off are: (1) the trunks and the underbrush in the forest offer mechanical obstruction; (2) the litter of the forest floor checks rapid surface drainage of the water and also acts as a sponge;

and (3) the network of deeply penetrating roots, living and decayed, make the forest soil more porous and permeable, hence the water sinks into it more readily.

So it is evident that the ability of the forest to check surface run-off is greatest when the forest is dense and when the ground beneath it is covered with an unbroken leaf litter.



FARMING IN THE PATH OF THE FLOOD. WUTAISHAN, SHANSI PROVINCE.

Mechanical action of tree-crowns.—It will be remembered that when water is precipitated from the clouds a portion of it is prevented from reaching the ground through interception by the leaves, branches and trunks of the trees. The intercepted portion varies according to tree species and the density of the woods. The various measurements made in Europe have given the following results:

Stations	Quantity of rainfall which reached the ground in well-stacked woods in per cent. of total rainfall.			
	Beech Woods	Spruce Woods	Scotch Pine Woods	Larch Woods
Prussian Stations	76	78	73	—
Swiss ,, ...	90	77	—	85
Bavarian ,, ...	78	73	66	—

The table shows that the intercepted portion of rainfall varies anywhere from 10 per cent. to 34 per cent., depending on species. This explains why after a rain, water continues to drop from the leaves and twigs for hours.

Evaporation.—It must be remembered that when water is precipitated from the clouds, a great portion of it, after a longer or shorter period and after serving one purpose or another in nature's economy, goes back to the air again through evaporation. Zikawei records show that the average annual evaporation in the shade is a little over 32 inches. This is enormous when we come to think that the average annual rainfall for nearly forty years is only about 57 inches. Evaporation then has a great influence in determining the amount of run-off of the streams.

It must be borne in mind, however, that there is a great difference between evaporation from soil in the open and from forest soil. Investigations show that evaporation in the forest is only two-fifths of that in the open country. On the other hand we must remember that the evaporation from the crowns of the trees is enormous. Trees like all other living things require water for growth. It is said that for every pound of dry substance produced, corn evaporates 233-lbs. of water, and turnips 910-lbs. Forest trees are the most highly developed form of vegetable life and as such they require for growth and development a much greater supply of water, and it simply means that evaporation from the crowns of trees must be enormous. The reason why in wooded regions the level of the ground water is lower than that in the wooded regions may be easily explained by this process of evaporation, botanically known as the process of transpiration, and to keep this process going, the forest must draw and consume heavily the water stored up in the earth.

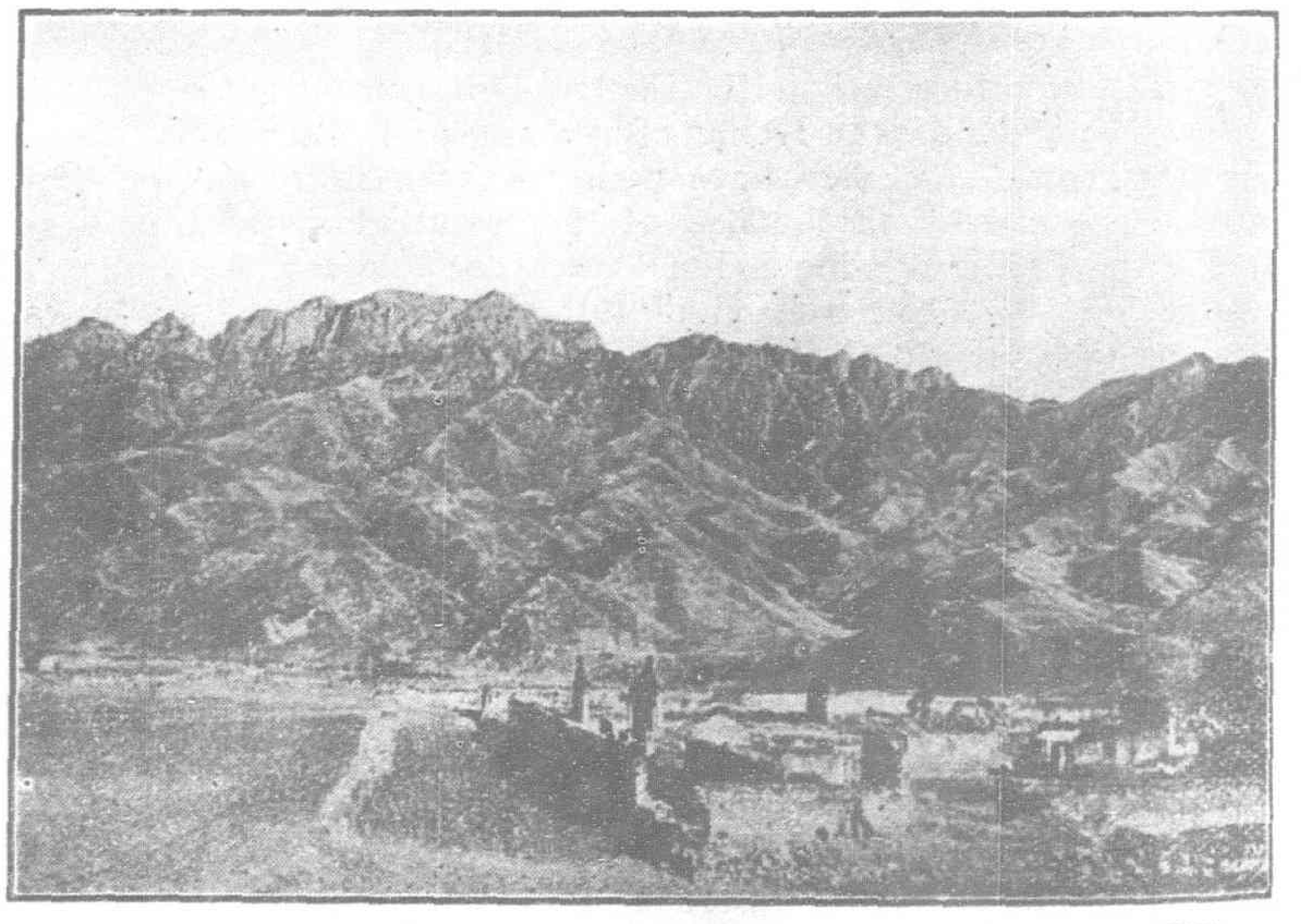
Soil erosion.—When water rushes down a bare slope it possesses great mechanical power. It loosens the soil and carries it downhill. It makes gullies and ravines and often causes landslides. The soil brought down not only renders the fertile land below valueless, but also goes to the silting up of streams.

It is generally admitted that of all the vegetable covers forests are most efficient in protecting slopes from the erosive action of running water. This is because (1) the roots of the trees hold the soil firmly in place and so increase its resistance to erosive action; (2) the crowns of the trees protect the earth from the violence of beating rain, and, as brought out in the preceding paragraph, intercept a considerable portion of it; and (3) the velocity of the moving water is checked because of the reduced amount of the run-off, hence the erosive force of the run-off itself is minimized. On the whole we may say that on a forested slope, a series of obstacles is always present to oppose the movement of the water, and reduce its velocity and force, and, consequently, its erosive action.

Depth of soil.—In forested regions the soil is not only protected from erosive action of water, but also made deeper. The depth of soil has a great bearing upon the amount of water which it can retain. A thin soil cannot retain much water, no matter what its character may be. The way in which the forest is able to increase the depth of soil is (1) by adding leaves and twigs which when decayed become a constituent part of the soil; and (2) by causing the underlying rock to disintegrate—this is on account of the mechanical action of the penetrating roots. When soil increases in depth it increases also in absorptive capacity, thus creating greater reservoirs for water.

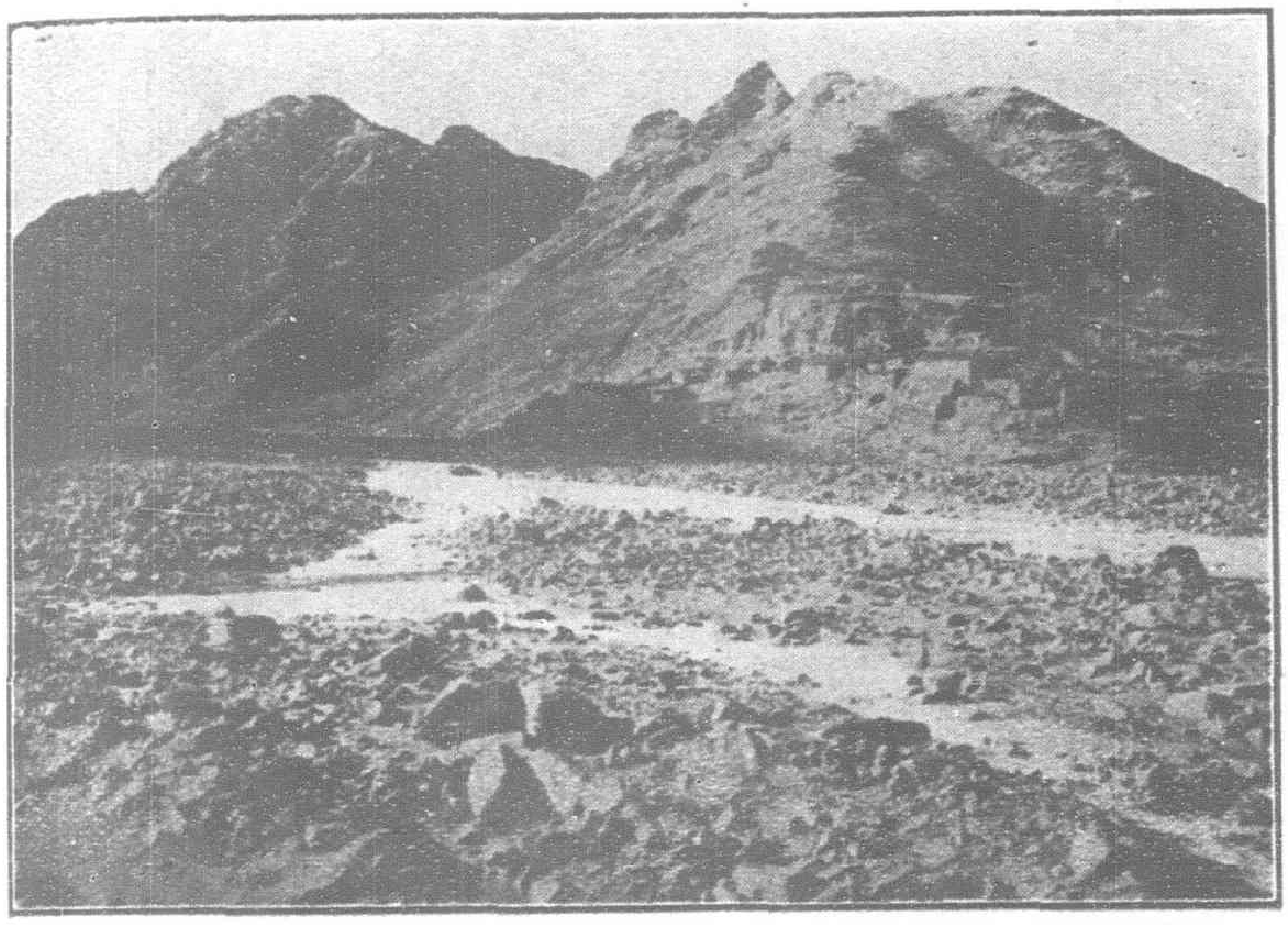
Stream flow.—So in fostered regions rain water is conserved in such a way that it is allowed to drip slowly down; hence we find in such regions streams do not rise high immediately after rains, and do not dry up where there is no rain, and there is always a great abundance of springs which go to feed such streams.

Forests regulate stream flow by conserving not only water but also snow. The influence of forests in retarding the melting of snow has been demonstrated with precision in a ten years' series of observations carried on at Moscow. Results show that the period of snow melting within forests is from twenty-six to fifty-seven days, while snow in the open disappears within six or seven days. The ability of the forest to retard the melting of snow is due chiefly to the shade and protection of the trees and of the leaf litter, and such gradual thawing will render it possible for streams to be slowly fed—hence a more even stream flow.



ORIGINALLY WOODED; SETTLED, CLEARED AND RUINED SINCE 1725. FOUPING, CHIHLI PROVINCE.

Closely connected with the gradual thawing of snow in cold climates is another important fact which must not be overlooked, especially in North China where so often we hear of spring floods. Spring floods are caused by rapid thawing of snow, together with the bursting out of ground water accumulated behind the icy dams formed at the battoms of slopes. The bursting out of ground water is explained this way: Forest soil is not only cooler than bare soil in summer time on account of protection and shade, but also warmer in winter months on account of protection from radiation by trees and the protection given by leaf litter. The leaf litter is a poor conductor of heat and it prevents the soil from cooling off and keeps it from freezing in winter, and in the processes of fermentation and decay contributes the heat which these evolve; and then there is the snow which protects it still further. Now if the soil of watersheds is thus kept soft and unfrozen, or only slightly frozen, the condition of the ground beneath will be such that percolation continues during winter and there is still that normal flow of ground water which goes to feed the streams. If, however, the soil is frozen and the flow of ground water ceases during winter (which, no doubt will be the case if the watersheds are forestless), then in the spring the ground water which has accumulated behind the icy dams will enter the rivers in large quantities, which the main channel is generally unable to discharge.



BOTTOM LANDS BURIED IN WASTE FROM DEFORESTED MOUNTAINS. WUTAISHAN, SHANSI PROVINCE.

Summary of forest influence.—The influence of forests on mountainous watersheds of streams, then, may be briefly summarized as follows:

(1) They protect the ground from the violence of beating rain and intercept a considerable portion of it.
(2) They reduce the amount of surface run-off by 20 per cent. to 35 per cent. of the precipitation, and often more with higher altitudes.
(3) They increase soil depth and hence the absorptive capacity of soil cover.
(4) They prevent soil erosion and check surface run-off in general.
(5) They increase underground seepage as shown by the abundance of springs in mountain forests.
(6) They retard the melting of snow.
(7) They give out vast amounts of moisture to the air by process of transpiration and yet tend to reduce surface evaporation.
(8) They save a greater amount of precipitation for stream flow and for their own growth than any other vegetation similarly situated.
(9) They create the most favorable conditions for a steady flow of water in streams.

Forests and Floods

With a knowledge of the facts summarized above we are in a position now to appreciate the relation of forests to floods. A mountainous watershed with trees growing on it will have a regulated system of checking and storing the rainfall, and such a condition is not likely to cause floods, unless there are unusual meteorological circumstances. While on the other hand, if the mountains are devoid of tree growth, it requires very little imagination to picture to ourselves how after a heavy rain the slopes will be thoroughly drained by a system of gullies and the water will sweep down through them in a fraction of the time that would be required if it had trickled down in a thin sheet or amidst vegetative obstacles. Now if the rain channel is unable to discharge the influx of water as fast as it rushed down, the result is a flood.

The high rate of run-off which is characteristic of streams arising from denuded hills and mountains enables them to carry an enormous amount of silt and boulders of extraordinary size. The transporting power of water varies as the sixth power of its velocity, so that if the velocity of a stream is increased ten times, for instance, its transporting power is increased 1,000,000 times. This is why, in the case of many rivers in China, they speak of stones and boulders of large size carried down to the foot of mountains, and of the enormous quantity of silt brought down to raise the beds that have already been silted up.

Flood Records

The records of floods for the different rivers in China are not kept, yet it is safe to say that floods in China are increasing in frequency, in severity and in duration in the many rivers. The reason for this increase is not far to seek. China has been allowing deforestation to go on unchecked for centuries, and, sad to say, this process of deforestation is still going on at an increased rate. The gradual decrease of forested watersheds with the gradual increase of denuded forestless watersheds can bring but one result, and that is the increase of favorable conditions for floods. In this connection it might be well for us to turn to some of the United States' records of floods which have been kept long enough on some rivers to show changes in the conditions of flow. The following table* taken from the United States Department of Agriculture Circular 176 gives records regarding the flow of ten important rivers of the United States on which careful records have been kept from periods ranging from sixteen to thirty-four years:

CLASS I.—FLOODS INCREASED.

Name of Stream	Years	No. of floods	Days of floods	No. of Low-water stages	Days of Low-water stages	Precipitation (inches)
Potomac	1890-1898	19	33	54	1,351	36
	1898-1907	26	57	76	1,693	37
Monongahela ...	1886-1896	30	55	66	912	42
	1897-1907	52	100	90	979	41
Ohio	1882-1894	46	143	79	1,333	41
	1895-1907	59	188	110	1,609	39
Cumberland	1890-1898	32	89	61	1,261	46
	1899-1907	43	102	65	1,576	41
Wateree	1892-1899	46	147	115	1,164	45
	1900-1907	70	187	64	508	47
Savanah	1890-1898	47	116	70	566	48
	1899-1907	58	170	41	292	46
Tennessee	1874-1890	32	173	71	902	53
	1891-1907	33	137	55	982	46
Allegheny	1874-1890	39	92	99	1,747	41
	1891-1907	53	131	91	1,136	36

CLASS II.—FLOODS DECREASED.

Name of Stream	Years	No. of floods	Days ot floods	No. of Low-water stages	Days of Low-water stages	Precipitation (inches)
Wabash	1890-1898	21	351	38	1,365	39
	1899-1907	19	279	44	1,160	35
Red	1892-1899	19	87	49	826	31
	1900-1907	16	60	8	208	29

The authors of the circular (Hall and Maxwell), after discussing thoroughly the different factors known to have an important influence upon the flow of those streams, observed:

> "The Cumberland River is a good example of how conditions have changed for the worse on some of the watersheds. The drainage area of the Cumberland River above Burnside, Ky., comprises 3,739 square miles and lies in the heart of the Cumberland mountains. The figures given in the table show that floods have increased in the Cumberland River at Burnside, Ky., in number from thirty-two in the first half to forty-three in the second half, and in duration from eighty-nine days in the first half to one hundred and two days in the second half, while low-waters have increased in times from sixty-one in the first half to sixty-five in the second half, and in days from 1,261 in the first half to 1,576 in the second half.

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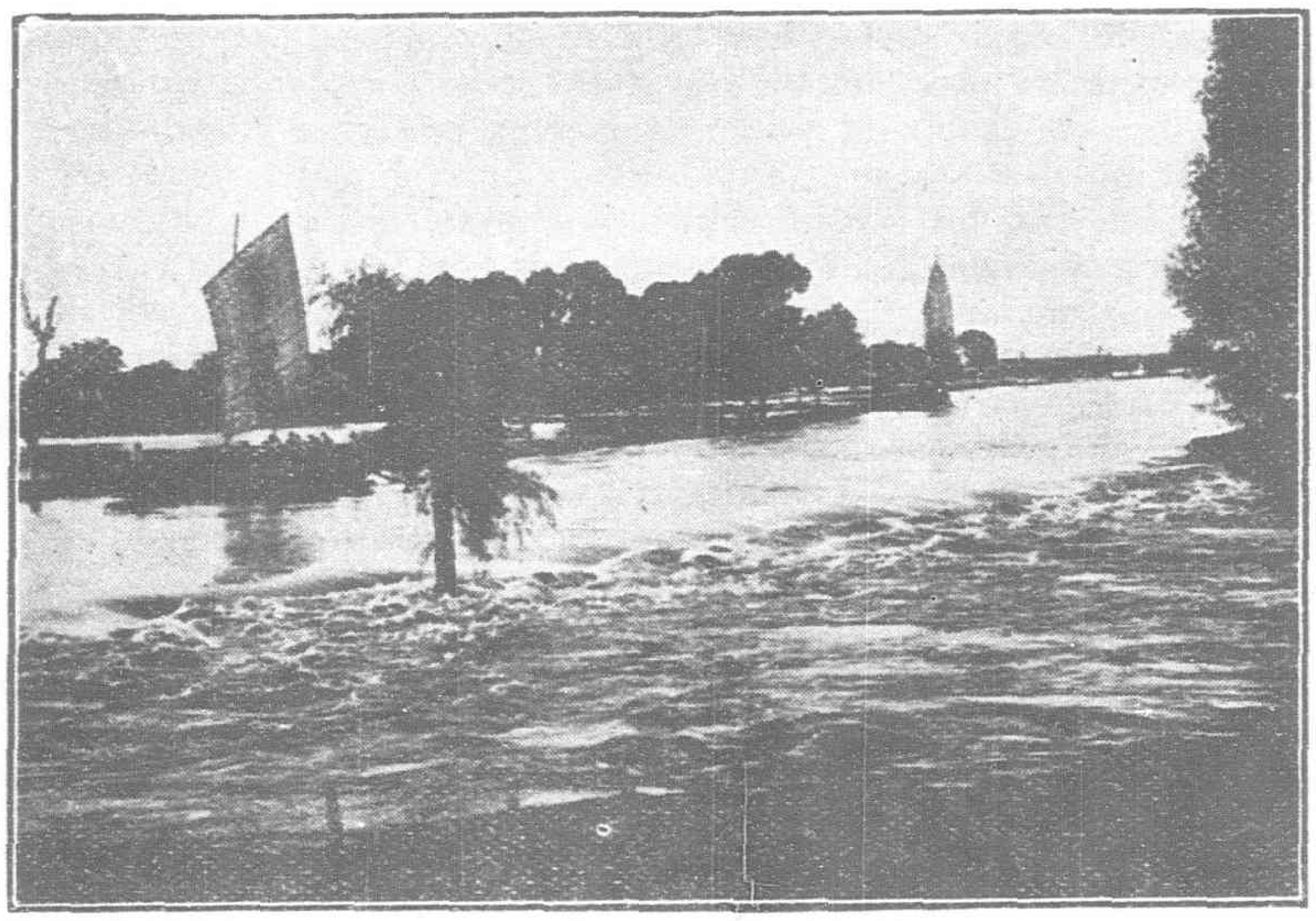
* For greater detail see Circular 176, pp. 4-6.



THE FLOODS OF 1917, BREAKING THE GRAND CANAL DYKE NEAR TIENTSIN.

"The removal of the forest on this watershed is progressing from three causes: (1) Clearing for agriculture; (2) lumber operations; (3) fires. In 1890 when these measurements were begun, 21 per cent. of the watershed above Burnside was cleared; in 1908 the cleared area had grown to 32 per cent. . . . Then at intervals fires ran through the woods on the hills and mountains where the Cumberland River has its source. Though the fires are slow and small, they burn the leaf cover and the upper layers of humus at each visitation. This removes or injures the porous surface, one of whose essential functions is to arrest the storm water falling upon the slopes and afford it an opportunity to sink into the ground."

"The behavior of the Cumberland River," the authors said in conclusion, "shows a direct and positive relation between the run-off and the changed condition of the surface. The changes due to agriculture and lumbering can be definitely stated, but the extent and effect of forest fires are not subject to exact calculation. Yet undoubtedly all of these influences are active in producing the results as shown in the flood and low-water records at Burnside. It is impossible that these results should be due to rainfall, because the rainfall was approximately ten per cent. less in the second half of the period. Since no other influences could have produced the result, there is no conclusion possible other than that the progressive floods and low-waters have been due to the changes accomplished on the surface of the watershed."

To give an example of a watershed where conditions have improved, the authors wrote as follows:

"The stream which shows this tendency in an unmistakable way is the Red River, which forms the boundary for many miles between Texas and Oklahoma. In this river the geology and topography have not changed. The precipitation has changed in the direction of lessened rainfall, but not enough to account for the record. But in soil conditions, and especially in the condition of the surface, the change has been marked. So the results which have appeared in the form of change of the flow in the Red River are precisely what ought to be expected from changes in surface conditions. In 1908 the Red River basin in Oklahoma had 10,200 square miles of improved land, instead of 3,284 square miles in 1900. Statistics are not complete for the Texas portion of this basin, but the Texas has developed at about the same rate as the Oklahoma part. The river's behavior has become better as the area of wild land has decreased. Wild and barren land being the worst condition for the protection of watershed, and cultivated farm lands being next to forests the best condition, the change of a large part of the watershed from the worst condition to the next to the best condition has brought about this result in the Red River. It is probable that the whole Red River basin above Arthur City in Oklahoma and Texas had 40 per cent. of its land under improvement in 1908 instead of 14 per cent. eight years earlier."

The conclusions gotten after so many years of investigation cannot but show that there is a close relationship between forests and floods. From such conclusions we wonder why floods in China have not been more frequent and severe, especially when there has been such an alarming increase in area of forestless watersheds.

Some Observations on China's Floods

That flood intensity and frequency have been on an increase in China is universally admitted. The so-called "phenomenal" floods or floods which China has not experienced for the last 170 years are no longer phenomenal for they seem to come around almost every year with greater severity. The Tientsin flood last year, which rendered more than 5,611,000 people homeless, and as many as 17,646 villages partly or wholly under water, was a terrific thing. It was caused by the simultaneous rise of water of the five rivers in Chihli, the chief of which is the Yungting Ho. These five rivers have their upland collecting basins in the mountains of Chihli, Shansi, and Honan provinces—covering a mountainous area of about 60,000 square miles. These five rivers have, as a matter of fact, only one outlet, i.e., the Hai Ho. The maximum capacity of the Hai Ho is 30,000 to 35,000 cubic feet of water per second, but the Yungting Ho alone carries down as much as 200,000 cubic feet per second during summer freshets. It is evident then that all the water that comes down in excess of the volume disposed of by the Hai Ho must necessarily overflow and become flood water on every side. We need only to recall some of the facts discussed under Forest Influence in the preceding paragraphs and then imagine for ourselves the enormous amount of water that the 60,000 square miles of deforested mountains and hills must shed during torrential rains, and then think further how the water rushes down the hillsides unhindered by vegetation, making gullies and carrying with it enormous amounts of silt. Those of us who have seen the flow of the Hai Ho cannot help comparing it to the flow of liquid mud. Since the Hai Ho cannot discharge such an influx of heavily laden water, the only alternative will be for the water to break through the embankments and overflow the surrounding country.

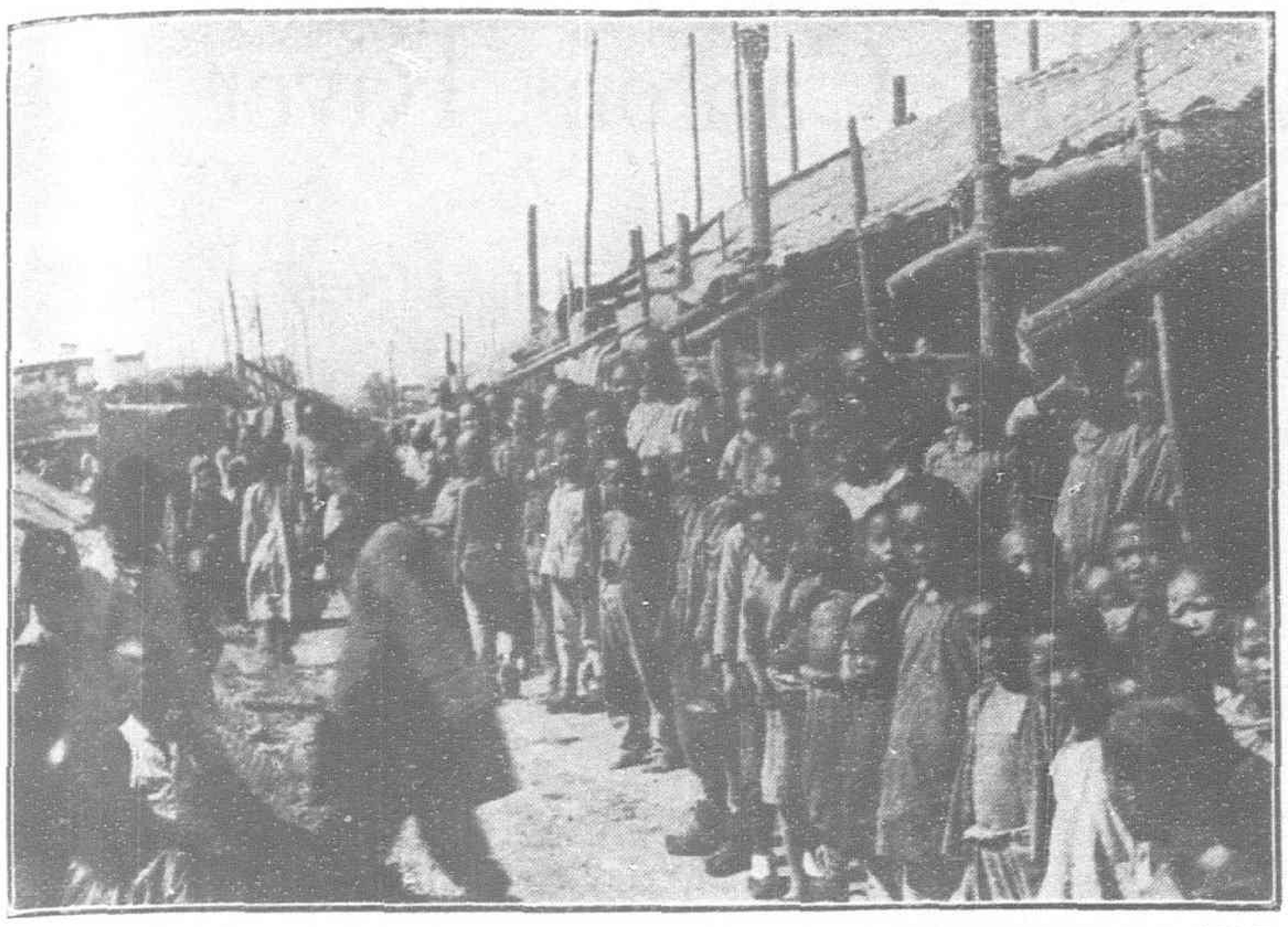
Remarks of some Engineers

One leading engineer who has been working to improve the river system of Chihli for many years and with whom the writer had an interesting conference, said: "The Chihli rivers during freshets have a discharge of from 150 to 200 times the discharge during dry seasons. For instance, the Yungting Ho in dry seasons discharges scarcely 1,500 cubic feet of water per second, but during freshets its flow rises to 200,000 cubic feet per second. It is evident that if a channel is prepared for this large discharge, it will dry up during dry seasons on account of the meagre supply of water. On the other hand, if the channel is good for 1,500 cubic feet, it cannot carry down to the sea 200,000 cubic feet during rainy seasons." Then he want on and frankly said: "Only reforestation on the upland collecting basins in the mountains is able to prevent this great difference of discharge, holding on nearly one-half of the rainfall during heavy rains, and giving it subsequently to the channel. Therefore, forests can be compared to a sponge for retaining rainfall and giving it up gradually."

HOW CITIES SUFFER IN CHINA. FLOODS AT TIENTSIN (FRENCH CONCESSION) IN 1917.

Another leading engineer, who after deploring the present condition of the different rivers in China, wrote at the conclusion of one of his reports as follows:

"The only way to diminish this evil (meaning floods) is to diminish the amount of soil brought down from the mountains. And the



A FEW OF THE THOUSANDS OF FLOOD SUFFERERS AT TIENTSIN IN 1917.

reason for this enormous quantity of silt coming down from mountains is that those mountains are bare so that during a heavy rain nothing prevents the water from rushing downward practically immediately after it has fallen, taking with it large quantities of soil. Now if those mountains were planted with trees, not only would the water then be unable to take away so much soil, but it would also reach the river gradually in a regular flow divided over a longer period and not within a few hours in fierce torrents. . . . The deterioration of the various rivers in China and especially of those in the province of Chihli would never have reached its present stage if deforestation had not taken place. . . . To build reservoirs in the hills in order to regulate the flow of water, as has sometimes been suggested, is not only far too expensive, but moreover wrong, as it does not do away with the problem of silt. Sooner or later these reservoirs will be filled, consequently new ones would have to be built, a process which would have to be carried on into eternity. . . ."

These remarks of the engineers are too evident and too conclusive to need further explanation. The problem of floods in Chihli, nay in all China, cannot be *permanently* taken care of by engineering works alone, no matter how much money is expended on it. The barrages, the reservoirs, the outlets, etc., will be silted up again after a few years of usefulness, just as the different streams have been silted up. We have heard that at some places the bed of the Yungting Ho is 20-ft. higher than the adjacent country. So it is evident that the problem of floods is not a problem of unrestrained run-off of rainfall alone, but also a problem of silt, which cannot be taken care of unless soil erosion on the mountain slopes is checked and stopped.

Side by side with these Chihli rivers we might mention two more rivers in the United States, the Queen's Creek in Arizona and the Cedar Creek in Washington, whose behavior seems to bear out what the engineers said of the Yungting Ho and the Hai Ho.

Queen's Creek has a drainage area of 143 miles where the annual rainfall is only 15-in. It flows over unforested watersheds and is subject to violent floods. It is said that the maximum discharge in 1896 was 9,000 cubic feet per second; whereas the mean discharge was only 15 cubic feet per second, and during a large part of the year the stream was dry. On the other hand, the Cedar Creek in Washington, with a well-wooded watershed, behaved entirely differently, although having a drainage area of equal size and a precipitation of from 93-in. to 150-in. The stream in 1907 had a maximum flood discharge of 3,600 cubic feet per second, and a mean discharge of over 1,000 cubic feet. In the opinion of leading scientists, "this radical difference in the behavior of the two streams can be explained only by the difference in the soil cover of the two basins." *

Uncontrollable Meteorological Conditions

We have often heard it said that floods in China are produced by exceptional meteorological conditions and that as such they cannot be prevented by either forests or engineering works. No doubt this is true. No forests, no reservoirs, no dykes and no outlets of any kind will ever be able to check floods, if these floods are produced by exceptional meteorological conditions, chief of which is excessive rainfall. But we are not concerned, however, with "exceptional" things but with things that occur with increased intensity and frequency every year and every month throughout China.

In this connection it might be mentioned that ordinarily countries with a forest area of less than 20 per cent. of the total area of the country show bad climate conditions with prolonged droughts, frosts, and alternating floods and low water. Portugal, with a forest area of only 3½ per cent. of the total area; Spain, with 16 per cent.; Greece, with 13 per cent.; Italy, with 14 per cent.; Turkey, with less than 20 per cent., are good examples of this. China, the horrible example of forest neglect, the only civilized country which has allowed deforestation to go on unchecked, with a forest area certainly too small to be considered, surely cannot escape this rule. The calamities she is experiencing now are but natural results of her long-continued forest denudation.

Conclusion

The object of writing this article is not to minimize in any way the importance of engineering works as a remedial measure for the control of floods. As a matter of fact, the deterioration of all the rivers in China to-day has reached such a stage that engineering works are absolutely indispensable in order to give temporary relief to the constantly inundated districts in the different provinces. But it must be remembered, however, that engineering works cannot have a *permanent* effect unless they are supplemented by a system of tree-planting on the different watersheds. Recently so much has been said about the need of some form of mechanism for co-ordinated and persistent public action to improve the hydraulic conditions of this country, and I can think of no better mechanism than that in which the forester and the engineer plan to work together—one on the upper and one on the lower collecting basins—and no doubt it is only through *such co-operation* that China can be given a *permanent solution* of her flood problem. The words of Professor Van Hise are indeed worth our consideration when he says: "*The best protection against flood is provided by a combination of forests and reservoirs.*"

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* "The Conservation of Natural Resources in the United States," by Charles R. Van Hise.

The Namtu Mines, Burma

The Burma Mines (Ltd.) is now erecting at Namtu, Northern Shan States, Burma, says a U. S. Commerce report, a mill for concentrating the lead, silver, and zinc ores of these mines. The mill is being erected under the supervision of American engineers and mechanics, and American machinery is employed throughout.

The mine is situated some 6 miles from Namtu, with which it is connected by a narrow (2-foot) gauge railway. The ore is brought out of the mine through a tunnel 2 miles long, and electric locomotives will be used to haul the mine cars through the tunnel to large storage bins at the portal. From the storage bins the ore will be railed to the mill bins at Namtu.

The mill will have a capacity of at least 700 tons per day and is laid out so that its capacity can be extended to 3,000 tons per day. The present 700-ton-a-day plant will cost approximately $1,000,000, of which $200,000 has already been spent in the United States for machinery and supplies. The purchases made in America consist mainly of gyratory crushers, electrically operated car tipples, crushing rolls, jigs, elevators, conveying machinery, cranes, electric motors, electric locomotives, general electrical supplies, concentrating tables, tube mills, continuous filters, steel plates, channels, beams, angle iron, and roofing materials.

The Burma Mines (Ltd.), an operating firm controlled by the Burma Corporation, is by far the largest mining corporation operating in Burma, and the Namtu Mine is one of the largest in the world. Considerable American capital is supposed to be interested. The resident manager and his assistant are Americans, and 33 other American engineers, superintendents, and mechanics are employed at Namtu.

A Scheme to Improve the Canton River

Captain Olivecrona plans a Continuous Self-maintaining Channel of at least 16 feet depth and 656 feet bottom width to cost $2,817,000

The importance which attaches to the proper improvement of harbors on the China coast may some day be appreciated by a Central Government which has sagacity enough really to grasp the problem of national existence and development. At present China possesses no adequate up-to-date harbor which is solely under her control. Those ports which do stand out as important owe their development and improvement to foreign initiative and pressure. Whether it is mere lack of understanding, or sheer ignorance of world movements, or common impecuniosity which restrains the Chinese from girding their loins and, like Japan, following the maritime development of other nations, we cannot say. But whatever it is the fact remains that in this year of grace, 1918, there is not one port over which China has complete and unrestrained control which has any up-to-date shipping accommodation. It is, therefore, refreshing to see that Canton possesses a Board of Conservancy works with a live Chinese, Mr. Tan Hsia-heng, as the Director-General. Everyone who has travelled in the south of China knows what the approaches of Canton are like—what a trial and a tribulation navigation of the river is, at certain states of the tide, to ship-masters—and can, layman though one may be, see the great need that exists for the application of scientific knowledge to the training, dredging, and maintenance of open channels if Canton is ever to assume importance as a port.

In the April, 1917, issue of the FAR EASTERN REVIEW, we published a report by Captain C. W. Olivecrona, the Engineer-in-Chief of the Board of Conservancy Works of Canton (issued by the Director-General, Mr. Tan), on the causes of the disastrous floods which periodically devastate the Kwangtung river valleys. That report—titled "The West Rivers Survey of 1915"—is now supplemented by a comprehensive one published as a "Project for the Improvement of the Approaches to Canton Harbor, with estimate of cost."

Mr. Tan Hsia-heng explains that "the question of improving the approaches to Canton Harbor was for the first time raised in the year 1902, when the Commercial Treaty between China and Great Britain provided for the removal of the artificial obstructions in the different branch channels of the Canton River, this work being completed in the year 1905. The improvement was, however, limited to the removal of such portions of the obstructions as were deemed necessary to afford a good, clear channel for shipping, but no conservancy work was included.

"The opening of the harbor for steamers of large capacity is vital to the development not only of Canton itself but of the whole province of Kwangtung. Being already the principal trade mart of South China, Canton would, if provided with a deep harbor, grow in importance and no doubt stimulate the commercial and industrial life within the province. I am, therefore, of the opinion that the execution of this project to improve the shipping facilities to the Canton Harbor is of such importance to the whole community, that it should be entered upon without delay."

Captain Olivecrona's report, the result of patient investigations, furnishes a general idea of the condition of the channels connecting Canton with the sea, and gives advice as to the measures to be adopted for creating and maintaining a ship channel between Canton Harbor and the sea, having a minimum depth at normal low-water of at least 4.9 meters (16 feet). On account of the disturbing political conditions, a complete survey of the Second Bar was not feasible, though some preliminary investigations were undertaken last Autumn, but Captain Olivecrona proposes the continuation of these investigations, as being indispensable for a proper judgment of the possibilities of improving the Bar to a depth of 6.1 meters (20 feet).

The report opens with a description of the features of the physical geography of the Canton River, and some thirteen pages are devoted to the hydrography of the river: the drainage basin; rainfall; run-off; the tides in general, and at Whampoa, in Canton Harbor, in the channels between Whampoa and Canton, and the discharge. The present condition of the riverbed is gone into fully, and then the discussion of the requirements of an improvement is entered upon. We mention the salient features of this section of the report.

Features of the Canton River

The Canton River proper is only a small river compared with others of Kwangtung province, and has its source in the Paktong mountains, Chungfa District, North of Canton. Of its main features Captain Olivecrona writes as follows:

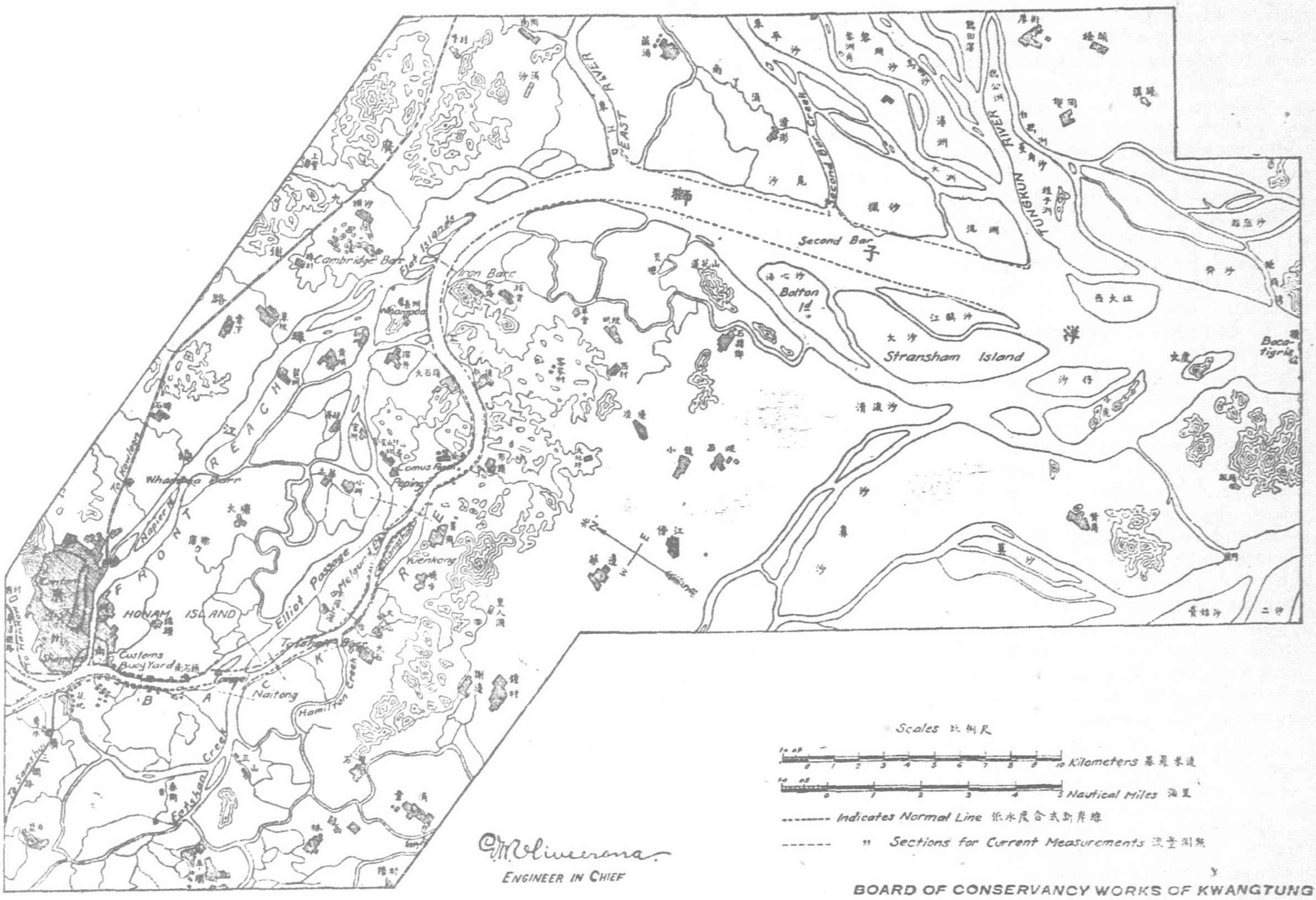
Just above Canton City, in front of Shameen, the river divides into two large channels: the Front Reach and the Back Reach, which join again some kilometers below Whampoa Anchorage.

The Front Reach, on whose left shore stands the city of Canton, is the shorter of the two; but on account of its shallowness it is not available for large river steamers except at flood tide. It does not receive any tributaries of importance, but is connected with the Back Reach by several channels intersecting Honam Island.

The Back Reach, by which name in the following remarks is meant the channel from Canton passing Taimei and Taishek to Danes Island, is about 5 kilometres (2.7 naut. miles) longer and describes nearly a semi-cirle with the Front Reach as a diameter. It has at present at its shallowest places a depth of 3.0 meter (10 feet) at lowest low-water, and is the only entrance to Canton Harbor for steamers in the coasting trade. It is connected with the lower course of the North River through two channels of importance, the Fatshan and the Hamilton creeks, and consequently receives from these creeks a fresh-water supply at nearly every stage of the water-level in the North River. About 7 kilometres (3.8 naut. miles) below Shameen, the Back Reach branches off into the Elliot and the Blenheim passages, of which the former is shallow and is used only by small craft. The Elliot passage joins the Front Reach at Whampoa anchorage. These two passages are connected by several channels.

Below Whampoa the different channels unite in one main channel, having a width of about 1,200 meters (4,000 feet). The direction is now due south and the river has the aspect of a magnificent estuary. Into this opens the East River, or Tung Kiang, on the left through numerous channels, forming a delta of its own, and the two rivers, now joined in one channel of about 2,500 meters (8,200 feet) width, empty their waters by this common channel into the sea. Before reaching the sea the stream is somewhat contracted between the Taikoktau and Anunghoi islands, this passage being called Boca Tigris. This widens again into the so-called Broad Way, which is the mouth of the combined rivers. Below Boca Tigris branches of the North River open into the Broad Way through several large channels, as does also one branch of the West River. Between Whampoa and Boca Tigris the Shawan channel connects the river to the right with innumerable waterways, intersecting the remarkable Canton Delta in every direction.

The tidal part of the river flows through low-lying land, at a level well within reach of the tidal range, which would be flooded twice every twenty-four hours if not protected by dyke systems constructed along the river banks. In the upper course of the river these dykes are withdrawn from the low-water shore-line, but lower down they are, as a rule, constructed close to this line. In the first instance the land between the dykes and the low-water line has by continuous silting been more or less raised, and a cross-section of the river shows a *minor bed* in which normal waters are confined, and a *major bed* bounded



MAP OF THE APPROACHES TO CANTON.

by the dykes, which only acts in case of extraordinary floods. Where the dykes are constructed on the low-water line a common width for all gauge-heights exists.

Except in its uppermost course the river flows through alluvial land with a stratum of sand and clay intimately mixed, underlaid by a formation of hardened clay. The river with its branches is a typical tidal channel, which as regards current and water-levels is entirely under the influence of the tide of the three rivers, the West, the North, and the East, which together have formed the Canton Delta. Though flat, the land on both sides of the river is dotted with hillocks and small mountain ranges. Only to the south of the Back Reach is a continuous range of hills encountered, though this is of slight elevation. The hills run parallel to the reach at a distance of about 3 to 4 kilometres (1.6 to 2.2 naut. miles) and approach the river-bed in in front of Danes Island. At this point other hills rise on the opposite side of the river, leaving openings of about 2 kilometres (1.1 naut. miles) width altogether. When the country is flooded, as happened in 1915, these gaps in the hill-range form the only outlet of consequence through which the water can escape. In spite of the considerable width, the flood caused on that occasion a head of water of 1.7 meters (5.6 feet) between Canton Harbor and Whampoa. This flood, the heaviest ever recorded, was due to several dyke-breaks along the left bank of the North River, which caused the waters to inundate the whole territory to the north-west and west of Canton and to break through the inland dykes in those regions. The inundation of Canton would probably not have occurred had the North River dykes remained intact, and thus confined the waters to the communication channels between that river and the Canton River.

Drainage Basin.—The drainage basin of the Canton River has in a previous report been estimated to cover an area of 4,600 square kilometres (1,776 stat. square miles). The figure was, however, very unsatisfactory, being calculated from a map in scale 1:

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1,000,000. The probable catchment area at Whampoa during the dry season has been defined on available government maps, and shows a total of 4,950 square kilometres (1,911 stat. square miles), which is 350 square kilometres (135 stat. square miles) more than the previous estimate.

Rainfall.—Observations of rainfall show that at Canton the wettest month is July, with a mean rainfall of 242.2 m.m. or 15.7 per cent. of the yearly total; the driest is December, with 40.1 m.m. or 2.6 per cent. The total mean rainfall for one year is 1,538.6 m.m., the lowest recorded being 1,115.0 m.m., and the highest 2,034.9 m.m. A wet year may accordingly show a precipitation 82 per cent. higher than a dry one. The maximum recorded rainfall in 24 hours occurred on the 1st of July, 1910 and amounted to 166 m.m.

The Tides.—As before mentioned the Canton River is a typical example of a tidal channel in the lower part of an alluvial delta. In consequence of the many channels that divide the approaching flood wave and convey it up to Canton Harbor again to be united, the action of the tide within the harbor and at intermediate places is very irregular. The average high water of spring tides at Whampoa for eight months is 9.13 feet; and low water, 0.95; of neap tides 6.02 feet, and 5.35 feet respectively. In Canton Harbor the average high water at spring tide is 7.62 feet and low water, 0.95 feet; while at neap tide high water is 5.27 feet and low, 4.18 feet.

Present Shipping Facilities

Having described in detail the character of the approaches to the Canton River, which are formed by the two deep-water channels in the estuary below Boca Tigris, Captain Olivecrona points out that the depth in these determines the draft of vessels which can ever be utilized in the shipping trade of Canton. The depth is at present 6.1 to 6.4 meters (20 to 21 feet) at low-water extraordinary spring tides. Allowing a margin of 0.46 meters (1.5 feet) under the keel, and counting the available minimum high water at neap tides to be 1.28 meters (4.2 feet), a vessel drawing more than 6.92 meters (22.7 feet) cannot enter the Canton River *every day* in the year. An improvement of the depth in the channels to below 6.1 meters (20 feet) would naturally improve the shipping facilities. This, unfortunately, seems beyond attainment in the present generation, as it would necessitate such enormous conservancy works and involve the outlay of such vast sums of money, that any such scheme would be injudicious. Taking this for granted, the improvement of the Canton River is then limited to a minimum depth in the fairway not exceeding 6.1 meters (20 feet) below low-water extraordinary spring tides. To what extent this depth should be carried through in the upper reaches of the river is only a question of cost, which will be dealt with later on.

By taking full advantage of the spring tides, vessels carrying a draft of 7.32 meters (24 feet) have succeeded in entering Whampoa Anchorage. Under the same conditions, Canton Harbor has once been visited by a steamer of 5.8 meters (19 feet) draft.

As the Canton Harbor is closed for ships above 3.78 meters (12.4 feet) draft, except at spring tides, such vessels have to discharge at Whampoa or more usually at Hongkong, from which places the cargo is then conveyed to its destination by junks and small vessels. It is evident that this extra handling increases expenses as well as the risk of damage to the goods. So important a business community as that of Canton cannot fail to recognize the disadvantage of such a state of affairs. An improvement in this respect would not only secure an uninterrupted transport of merchandise to Canton from abroad and *vice versa*, but naturally would also decrease the cost of foreign merchandise to the benefit of the consumers both in the city and throughout the province.

Scope for Possible Improvements

The general tendency all over the world to increase the capacity of ocean-going vessels, including an increase in their draft, is a serious consideration to communities dependent upon their harbor facilities for their trade, reminding them to investigate to what extent their harbors can meet the demands for improved accommodation necessitated by the increased dimensions of ships. It is true that, owing to the natural conservatism of commerce and vested interests, trade seldom leaves a place which has fair chances to cope adequately with the needs of the traffic, even if another port in the vicinity offers better facilities. This fact, however, can only be reckoned on to a certain extent, because, when the economy of improved transport is realized and begins to exercise its influences on prices, the trade turns in the direction where these improvements can be utilized. An old port with established trade must, therefore, improve steadily with the development of shipping, to avoid the risk of being outclassed by competitors of recent origin.

Its navigable depth being thus one of the chief characteristics of any harbor, it is evident in order to be able to plan wisely for the development of a harbor, one must investigate what size of ships the harbor has to accommodate. With reference to the approaches to Canton, the size is already defined by the depth of water in the channels outside of Boca Tigris. This being 6.1 meters (20 feet), it is useless to attempt any improvements in the upper reaches of the river above that depth. Even 6.1 meters (20 feet) water cannot be expected beyond certain points. It would be possible to deepen the Second Bar to 6.1 meters (20 feet) and, by utilizing the tidal range, to conduct vessels of 6.9 meters (22.7 feet) draft every day of the year as far as to Whampoa Anchorage, and to Changshan Island. Going any further with an improvement to that depth would, however, involve such costs that it does not seem at present justified from an economic point of view. For that reason the Canton Harbor as now situated can hardly claim to rise to any importance except for the coasting trade. However, by utilizing the available natural resources a good harbor could be established lower down the river, where sufficient depth for the anchorage of ships able to pass the estuary, prevails. The Canton Harbor problem, therefore, is not solved in its entirety by recommending the regulation of the approach to the present harbor, but also involves the solution of several other questions, connected with the establishment of an up-to-date sea port. Such a harbor must be provided with appliances which allow a rapid and cheap transportation of the cargo from and to the ships, with storehouses and docks, and, last but not least, with good lines of communication to the hinterland. The last condition being of most importance for the development of a harbor into a good trade mart, it is generally disadvantageous to confine the harbor to an island. Where the maritime conditions permit, a harbor ought, therefore, to have its site on the mainland. In the case of Canton it seems to me that the future development of the harbor is bound to follow the Back Reach, not only because this channel will always remain the main route to the sea, and consequently receive the sea-going vessels, but also on account of favorable sites along its shores for industrial and shipping establishments. Furthermore, when in the future the connecting line between the Hankow-Canton and Canton-Samshui railways has been completed, the latter extended along the West River valley to Kwangsi, and finally the much desired railway communication between Canton and the lower delta established, a deep water harbor in a suitable section on the right shore of the Back Reach below Changshan Island, connected with this extensive railway system, might become a necessity. Until such a deepwater harbor is demanded as a consequence of a general development of the country, Canton may continue to profit by the vicinity of the excellent harbor of Hongkong.

Considering the magnitude of this problem, a judgment on which calls for more thorough investigations than have been completed at present, and taking into account the considerable expense involved in the realization of a scheme like this, I deem it advisable not now to go into this project. Even if later on a deep water harbor should develop further down the river, the necessity of and reasons for improving the Back Reach above Changshan Island in order to make the Canton Harbor more accessible than at present, still remain. The following scheme does not in any way interfere with a future development on these lines.

Aim of Improvements Proposed

The investigations now completed show that a deepening of the Back Reach above Changshan Island to 4.6 meters (15 feet) below lowest low-water at Canton can be accomplished within reasonable costs, and should also, for the time being, meet all reasonable requirements. Any further development of the channel may safely be kept for future consideration, when the effect on the riverbed, resulting from the previous conservancy works, becomes known. Deepening the Back Reach to 4.6 meters (15 feet) does not imply any improvement of the Second Bar, but with a future development of a deepwater harbor as an extension of the Canton Harbor in sight, the Second Bar cannot be left out of consideration, and it should, therefore, when circumstances call for it, be improved to 6.1 meters (20 feet) depth.

With a depth in the Back Reach of 4.6 meters (15 feet) and on the Second Bar of 6.1 meters (20 feet) the following shipping facilities would arise:—

Vessels Proceeding to	Draft of vessels passing					
	Any time		Twice a day		Spring Tides	
	m.	feet	m.	feet	m.	feet
Whampoa or Chanshan Island	5.64	18.5	6.92	22.7	7.93	26.0
Canton Harbor	4.11	13.5	5.24	17.2	6.03	19.8

The figures in this table compared with those in the previous paragraph show the advantage to the shipping to be derived from the improvements which I am about to propose.

It is a matter, of course, to divide the work into two stages independent of each other but in the following order, namely:

(*a*) The improvement of the Back Reach,

(*b*) The improvement of the Second Bar.

The first would meet the most urgent needs, and the second would become a logical consequence of the success of the first. The report does not include any scheme for improvement of the Second Bar as the necessary investigations are not yet completed.

The aim of this project is to create a channel of a minimum depth of 4.9 meters (16 feet) below N.L.W. with a bottom width at this depth of about 200 meters (656 feet), the depth corresponding to 4.6 meters (15 feet) below zero of Customs Water Gauge at

Buoy Yard, Canton, and by restricting the width of the channel and partly closing the tributaries and branch channels, to establish a self-maintaining channel from Canton Harbor to the sea.

Captain Olivecrona details his improvement scheme, and points out that the works now proposed are not likely, nor are intended, to inflict any serious changes on the *régime* of the river system as a whole. Diminishing the total sectional area by closing certain channels, or parts of them, will, of course, change the conditions locally, but will not greatly affect the tidal flow in the upper reaches, as the main channel has at the same time been enlarged to compensate for losses in area. As a consequence of the unification of the flow into one main channel, higher velocities in the tidal as well as in the freshwater currents are expected. This is essentially one of the aims of the regulation, as the current provides the energy through which the self-maintenance of the channel is made possible. The Senhouse and Elliot Channels, which already now are silting considerably, will be subject to a more rapid increase of this process. The Hamilton and Fatshan Passages on the contrary, being exposed to an increased tidal action, are liable to deepen or at least maintain their present conditions.

The training works have been designed for the purpose of directing the flow in such a way as to utilize its scouring capacity most advantageously. They will also serve to fortify the new shore lines and cause the space between the normal lines and the old shores to be silted up.

Dredging has been resorted to in cases where an increase in the areas of the low-water sections is indispensable, and where it has been necessary to open communication between two deep water channels. As dredging is an expensive operation, it has been limited as much as possible, leaving to the scouring forces to complete the removal of silt from the shallows to the pools.

By carrying out the proposed works a continuous self-maintaining channel of at least 4.9 meters (16 feet) depth below N.L.W. level, and of at least 200 meters (656 feet) bottom width, is expected to be established between the lower end of Changshan Island and the Canton Harbor.

The engineer gives his reasons for proposing, if the suggested work is gone on with, to let out the dredging operations as contract work, but put all other works under a constructor's own administration for execution.

Estimated Cost and Raising Funds

The cost of the proposed work is estimated by Capt. Olivecrona at $2,817,000, Hongkong currency, and he makes the following suggestions regarding the raising of funds:—

The improvement of the approach to the Canton Harbor is a matter that concerns not only the local interests, but also those of Kwangtung Province and South China in general. Therefore, it is only fair that the parties concerned participate in defraying the cost of such an improvement. The parties having interest in the undertaking are thus Canton City, the Province of Kwangtung, and, on behalf of South China, the Central Government. The following proportion, at which the expenditure should be divided appears reasonable, when taking into consideration the different weight attributed to the scheme by the parties concerned. My proposal does not, however, pretend to be a final solution of the financial question, as other methods of raising adequate funds may prove more eligible:—

The Canton City, as drawing the greatest benefit of the improved conditions, should be responsible for three-fifths of the costs. This sum should be raised by a yearly taxation of the value of trade passing through the Maritime Customs in Canton. In order to show how the taxation would work, I have made the following calculation based on figures derived from the Maritime Customs report on the Returns of Trade for 1917. The Returns state that goods to a value of Hk. Tls. 102,844,940 passed the Canton Customs during the year. An additional tax of, say, 0.25 per cent. would surely not be much felt by the people, but would yield a yearly amount of Hk. Tls. 250,000.

Supposing further that the Central Government and the Provincial Assembly each guarantee one-fifth of the remaining cost, and allot yearly a sum of Hk. Tls. 50,000 for the purpose, a total amount of Hk. Tls. 350,000 would be yearly available to meet the costs for execution of the river improvement scheme. At the present rate of exchange this in Hongkong currency amounts to $560,000. The total cost for the scheme is calculated to $2,817,000, which sum would be very nearly covered from five years taxation and contribution.

Funds have been found in a similar way for works already executed or in execution at Newchwang, Tientsin, Chefoo, and Shanghai, and there is every reason to believe that the method should work satisfactorily also at Canton. Improvement of the shipping facilities would, no doubt, be of such far-reaching consequence to the City that it would be well worth the money.

Chinese Capital in Hongkong

(By Our South China Correspondent.)

The following is a true story of money made rapidly in the Colony of Hongkong. A certain European had a sum of £600 remitted to him three or four years ago. The dollar was then at about two shillings and so omitting fractions for the sake of simplicity, the European had about $6,000. He decided to build a house and he persuaded someone—probably a local bank—to advance him $10,000. He had a very good knowledge of local contractors, and it is therefore possible that he was fortunate in persuading a contractor to build his house for the inclusive sum of $16,000. No sooner had the contract been let than the cost of building, especially of all wood-work, increased, and simultaneously the value of household property increased. In addition, largely owing to the unrest in South China, the influx of Chinese citizens and Chinese money into Hongkong became greater and greater. And then, when the dollar had risen in value to 3/3d., the European had an offer from a Chinese gentleman who wished to live in a modern house built according to European ideas. He, therefore, sold his property for $27,000. Having paid back to the mortgagee the borrowed $10,000, he converted the remaining $17,000 into sterling at 3/3d, obtaining £2,637. Thus in about four years his original £600 had been multiplied more than four-fold.

Of course, the European was lucky to obtain such a beneficial exchange fluctuation, but even without that he would have made a very handsome profit. And the reason is quite simple; it is the old law of supply and demand. For in recent years the Chinese have demanded European residences in the Colony of Hongkong and they have also desired to invest their money in the place. It is both of these facts which is so important for the prosperity of Hongkong. It is one more piece of evidence that we are at the commencement of a period of extraordinary industrial activity in the Colony. For the Chinese have discovered that their capital is safe and they can obtain good interest.

It should be remembered that the days of the limited liability company in Great Britain are comparatively recent. Before those days the savings of people who were not interested in a business of their own almost automatically went into house property. It was the era of building societies. In Hongkong we do not have building societies, but there are public companies which own properties and the shares may be, and are bought by, Chinese.

At the beginning of the local "boom" in property the Chinese from Canton thought mostly of their own places of residence in the Colony, although some bought property as an investment. They had probably heard something of the story of how the ex-compradore, who is now Sir Robert Ho Tung, laid the foundations of his fortune—he is popularly supposed to be a sterling millionaire—by buying up property in Hongkong from British owners who had retired. The absentee landlords were probably not as well aware as he was of the increasing demand for rooms, shops and tenements. Whatever the reason, the fact remains that during the last ten years enormous sums of money have been invested by the Chinese in property in Hongkong.

Most of the available building sites near the city of Victoria are already occupied. There is, of course, the project of further reclamation at West Point, but that will take some years. There is practically nothing left on the sea-level and anywhere the cost of preparing the sites is now very much greater than it used to be, for there is much more cutting and filling to be done. And the authorities of the Public Works Department of the Government are much more difficult to please. That is an advantage to the community, perhaps, but it is also a reason why buildings are now more costly to erect.

Speculation Rampant

There must be, also, very great speculation on the part of the local Chinese. The following story is true as to facts even though it may be unwise to mention names. A rather isolated house was built for a worker in a missionary society some time ago. It is said that fifteen years since a sum of $20,000 would have been gratefully accepted for it, and the story gains credence from the fact that less than ten years ago the writer was offered a larger and nearer detached house within the metropolitan area of the County of London for £1,200. However, the house in Hongkong was in the market last year, and several Chinese buyers were so keen to obtain it that the missionary or his friends who owned it obtained nearly $90,000 for the property, and many other cases could be quoted to show that Chinese will pay what Europeans consider to be exorbitant figures for house property.

Recently an important innovation in the direction of Chinese syndicates operating has been in evidence. A few days ago I accompanied an English engineer to the new reclamation works near Kowloon old city. About the engineering details of this important scheme I shall have more to mention in a future issue. All that need be said just now is that the scheme is remarkable because of its financial details, all of the capital necessary has been raised among the Chinese. An English architect suggested the scheme to some of his Chinese friends, and a syndicate was promptly formed. It is no wild-cat scheme, but a definite and most important piece of reclamation work. About ten million square feet of level ground will be available for a sort of garden city. Most of the area was, a couple of years ago, washed by the tide. At present a long sea-wall is being built across the bay and behind that sea-wall thousands of coolies are throwing thousands of tons of earth from the hill-side into the space where the sea-water stood for centuries. Locomotives and railway trucks bring some of the "filling" from a more distant hill.

More than a million dollars will be spent on the scheme before the present contract is completed and it is very probable that the Chinese shareholders will spend three or four million dollars on that site during the next few years.

Local Industries

Another piece of evidence which reveals the increasing confidence of Chinese capitalists in the Colony of Hongkong is supplied by the local share market. British investors have had two incentives causing them to sell local shares. In the first place the many appeals to their patriotism have caused them to invest in war loans. In the second place, all of them have one eye fixed on the day when they can retire, and when they can settle down to a well-earned rest "at home." The exceptionally high rate of exchange has tempted many of them to sell their dollar shares and to invest in sterling securities.

A natural result would be a "slumps" of dollar shares, and yet quite the reverse has happened. The reasons are that all of the local dollar companies have had good years and good balance sheets to show, and, more important still, the Chinese have demanded the shares.

Let us take, merely as an example of a local industry, the shares of the Hongkong Electric Supply Company. About eighteen months ago, when the local dollar was at about 2/6d. it was possible to buy those shares (originally issued at $10 and at one time quoted at $2.50) for something less than $50. Now that the local dollar stands at 3/4½d. the shares are more than $60. Thus in about eighteen months the sterling value of the shares have increased from £6 5s. 0d. to £10 2s. 6d., or even more.

If that were an isolated case it would, of course, be accounted for by some peculiar circumstance or the sagacity of the directors. The concern is, of course, financially very sound; but the point of the illustration is that is an indication of the fact that the Chinese are anxious to invest their money in local industrial concerns.

The next phase is commencing. A flourishing tobacco factory is flooding South China with cigarettes, competing successfully with the largest European tobacco trust, and making handsome profits. There are local knitting factories run entirely by Chinese and millions of pairs of socks are made in those factories. That sort of thing must inevitably spread. Hongkong is attracting, *not only* Chinese money, but Chinese enterprise. The Cantonese know of the large fortunes amassed by their relatives in Singapore and the Straits Settlements, under the protection of the British flag. They appreciate the value of that protection in the Colony of Hongkong. Indisputable evidence of that fact is furnished by the many local enterprises in which they invest their money and energy.

Electric Light and Power Plants at Antung

[By Consul John K. Davis, Antung.]

During the first week in July the electricity department of the South Manchuria Railway Co. commenced the construction, immediately to the west of the Japanese Settlement at Antung, of a new electric light and power plant, the cost of which is estimated at the equivalent of $210,000 United States currency. Two generators, each of 1,000 kilowatts capacity, have been purchased from an electric power company in Japan, which has itself now purchased new dynamos.

It is stated that this plant will be completed and in operation by December, 1918.

The electricity department of the South Manchuria Railway Co., which is the only company furnishing electric light and power in this consular district, already operates two plants in Antung. The first of these is located in the Japanese settlement, but immediately adjoining the Chinese city of Antung, which it supplies. The engines and generators are of German manufacture, the motive power is suction gas, and the total daily output is 2,600 kilowatt hours. The fuel used in the first plant is coal and that used in the second coke. The current as delivered at points of lighting is 110 volts and 50 cycle alternating. At present these two plants are unable to supply the existing demand for current which, during the past two years, has grown greatly as a result of the continued high cost of kerosene oil. At present 3,319 buildings use 32,394 lights.

Thirty-seven motors developing 415 hp. are so far employed as follows: in sawmills, 17, total horsepower 136; rice mills, 6, total horsepower 15; machine shops, 5, total horsepower 28; pumping stations, 2, total horsepower 220; miscellaneous use, 7, total horsepower 16.

The rate charged for electricity is 25 sen (12½ cents American currency) per kilowatt hour, subject to a 10 per cent discount for the payment of bills at the company's office within the first seven days of the succeeding month, and with a minimum monthly charge of 30 sen (15 cents) per light. The rate for power use is 6 sen (3 cents) an hour per contracted horsepower up to 200 per month, and 4 sen (2 cents) an hour per contracted horsepower over 200 hours a month.

While the new plant will, of course, remedy the present insufficiency of current for lighting purposes, it is intended primarily to furnish motive power for several new manufacturing enterprises which it is expected will grow up in its immediate vicinity. The first of these will be the Anto Yoko Silk Mill, in which it is planned to spin silk waste. In addition to this a box factory and several other smaller enterprises are being considered.

The report of the Filipino Association of Chicago calls attention to the fact that there are 118 Filipinos in that city. Of these 90 per cent. are students, and of these in turn 70 per cent. are entirely self-supporting. The Society, which was organized in October, 1913, now aids the students by finding employment for them, by financial assistance, and in other ways, such as social gatherings and entertainments. The Committee is now carrying on in the Philippines a campaign for a Chicago club house. Its address is 3504 Walnut Street, Chicago.

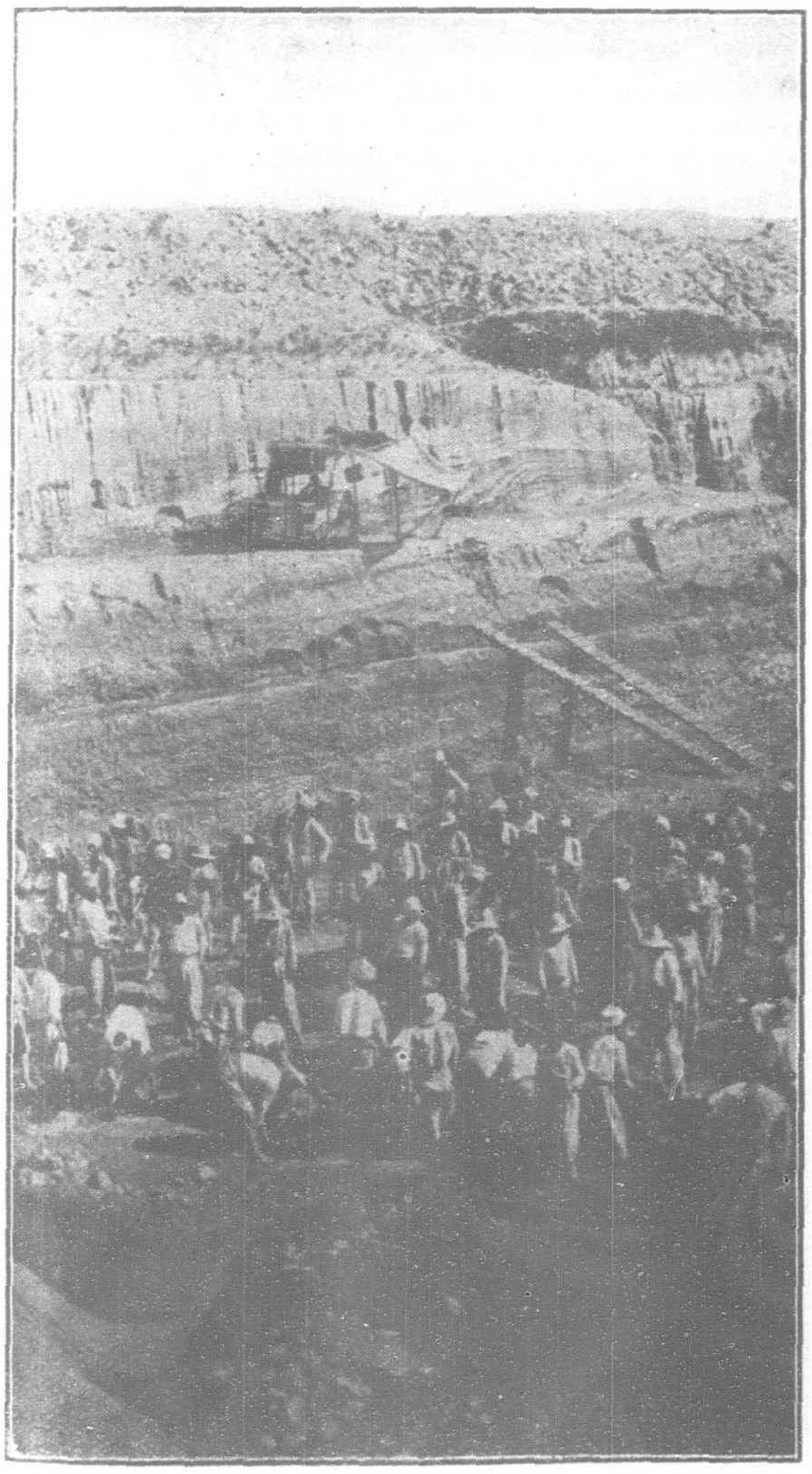
A Korean Gold Mine

An Interesting Description of Native Methods of Mining without Machinery

There is an old Korean saying that water is the enemy of the placer miner. The statement would scarcely meet with approval in the desert gold camps of Australia, or in parts of the world where hydraulic mining and dredging are in full swing, but in the flat valleys of Korea the native miner is often baulked by the difficulty of pumping the water from his workings.

The Native "Pump"

They have a native pump made of a shallow wooden box with four ropes attached, and operated by two men at the sides. With a rapid swinging motion they snatch a boxful of water from a sump below and toss it into a catch basin above. In former times, and occasionally even now, large pits were unwatered by this means, the pumps working in steps, one above the other, to raise the water the necessary height, and often with several sets of men on each step working abreast. During the last few years, however, centrifugal pumps driven by steam or gasoline engines have been employed to fight their proverbial enemy, and several large mines have been thus opened up. One of the largest of these, near Pyeng Yang, is shown in the accompanying illustrations. About four hundred men are employed and the ownership and management is entirely native. The pumping plant is at the lower end of the mine, connected with all the workings by a canal. This drains the property and relieves the miners of further trouble on this account, except that when nearly down to bed-rock a few native pumps are used in each pit to raise the water from the bottom up to the level of the drainage canal.



KOREANS DIGGING PAY-DIRT.

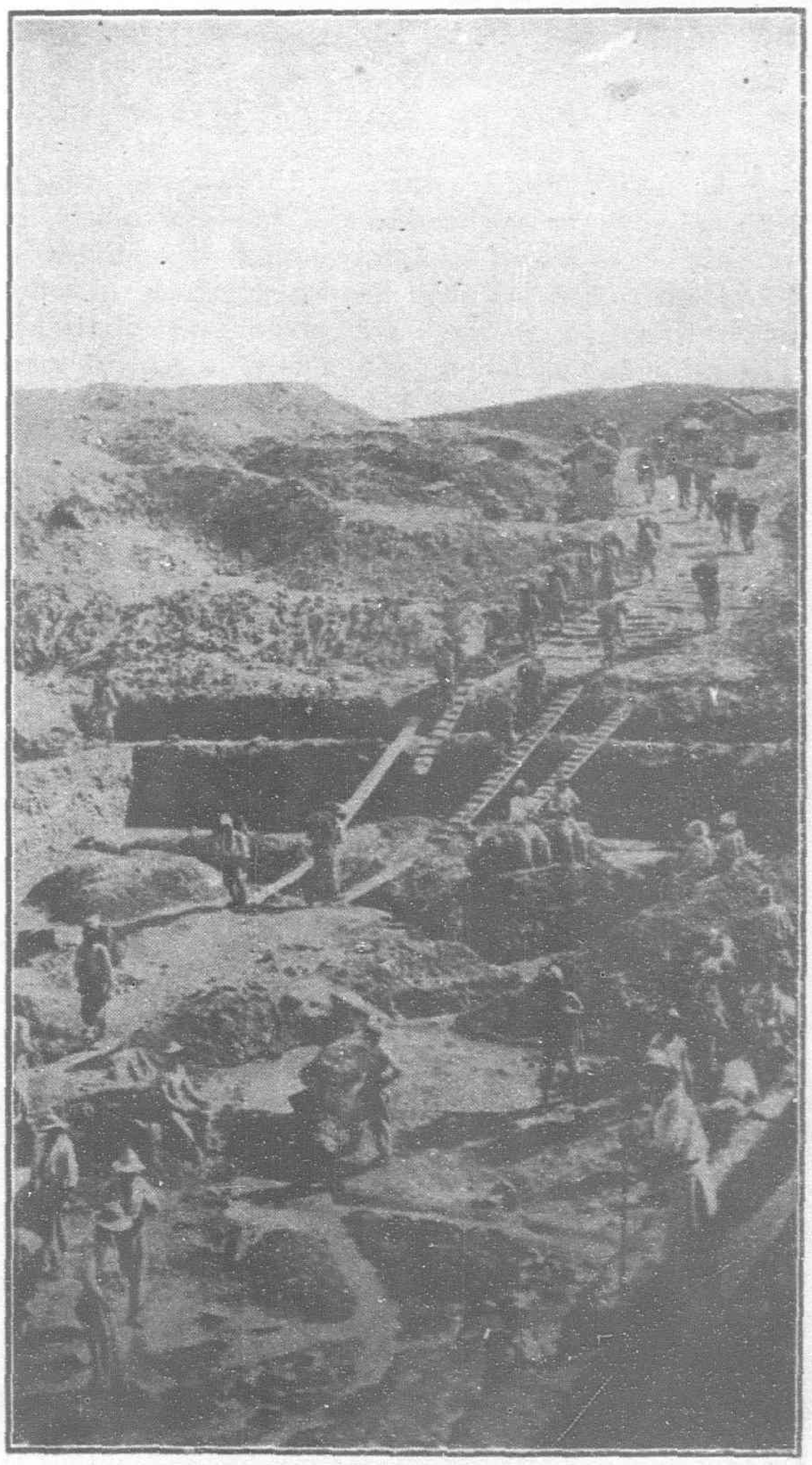
Mine Without Machinery

Aside from the pumping plant with its small steam engine and centrifugal pump, all the methods and equipment are strictly native. This, of course, means the entire absence of machinery and the minimum even of iron implements, combined with the maximum of human labor. The mining system is simple. Pits about one hundred feet square are taken out. The top twenty feet of dirt is stripped off and thrown on the waste heap, after which the pay, the last few feet above bed-rock, is dug up, carried to a sluice where it is washed with running water, and the residual material from there panned by hand. The pits are started in succession, several being in process of excavation at the same time. This gives the operators a steady revenue, for in one pit or the other pay is always being excavated. It has also the incidental advantage for the visitor that all steps of the operation can be seen working at once.

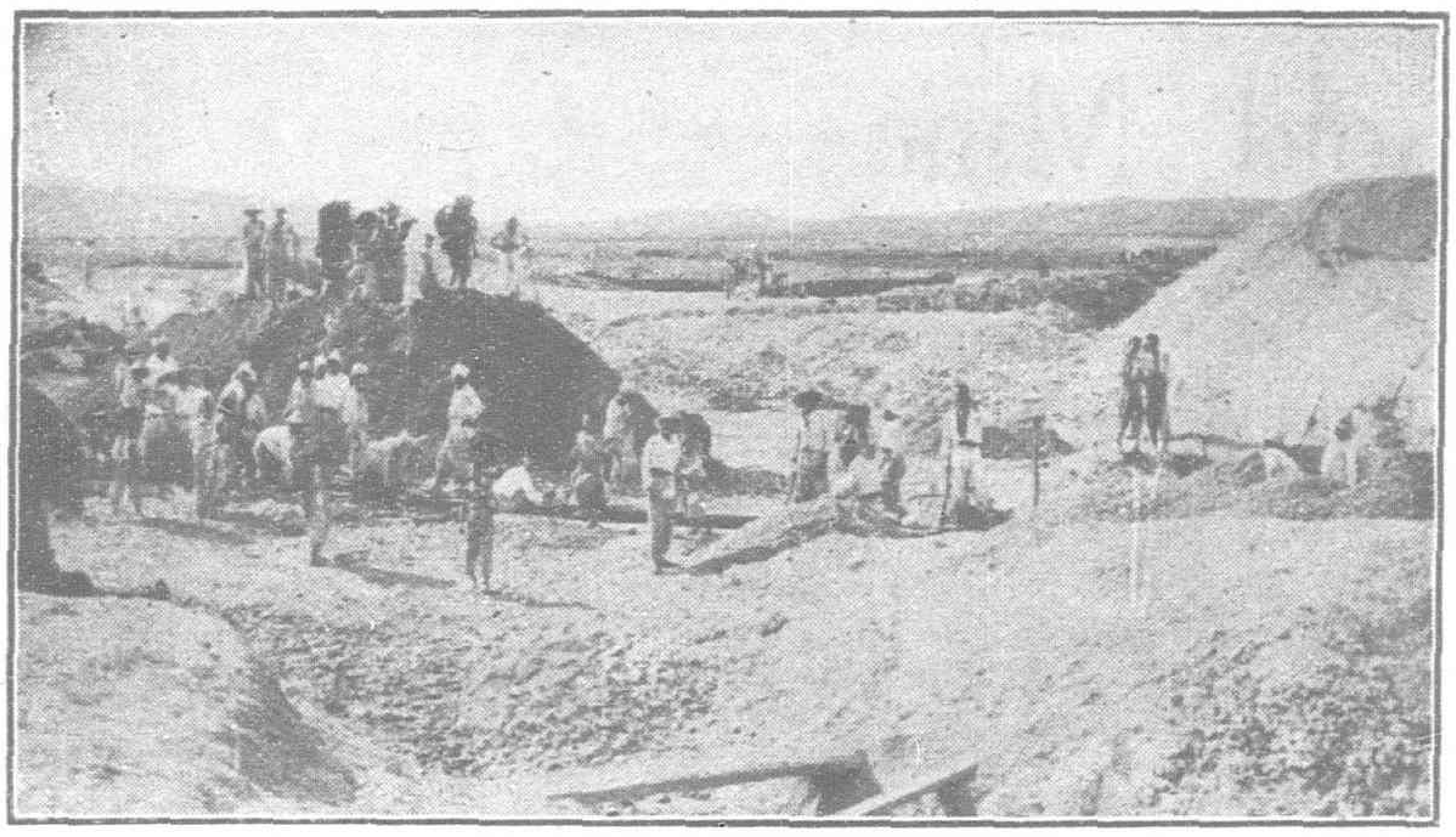
No Shovels except a Giant one

To a foreigner an amazing feature is the entire absence of shovels—except the giant shovel, a remarkable tool used in digging ditches, operated by five men, one holding the handle and the other four pulling on ropes attached to the blade. In the regular work a small native pick and a shallow basket holding a good shovelful, comprise the miner's equipment. With these he attacks the pile of dirt at the face, breaking the lumps with the pick and scraping the dirt into the basket. The contents of this he keeps dumping into a larger "back carrying basket" on the back of a man nearby.

The basket coolie corresponds to the mine car in America and although his individual capacity is small, the deficiency is made up in numbers. Along all the working faces are long lines of them, backed up waiting for the gangs of miners to fill their baskets, and continuous streams keep arriving empty and hurrying away with loads.



CARRYING PAY-DIRT TO THE SLUICE.



THE SLUICE IN A KOREAN MINE.

The Native Sluice

The sluice, beside which the coolies dump their baskets of pay dirt is a channel a few feet wide and fifty feet long cut in the ground, the bottom lined with flat stones and the sides with boards. Water from the pumping plant is used to furnish a "sluice head." As the gold is fine and associated with large amounts of black sand and clay, the washing is a difficult matter. The sluice is always the center of a crowd of men, some with paddles breaking up the lumps and stirring the material as the water carries it along, others with coarsely woven wicker scoops removing the stones and large pebbles, and still others feeding the pay-dirt in at the top and scraping away the tailings. A clean-up is made once a day, the stones in the bottom of the sluice being taken up and the gold and black sand that has lodged between them removed for a final panning in large wooden bowls.

A Lesson in Labor Control

At first sight a mine of this kind, swarming with men, appears a hopelessly crude and wasteful affair, but a little study reveals a good deal to admire in their methods. Very few of the hundreds of coolies need have any pangs of conscience when they draw their pay. They are given very little chance to shirk. The miners, pumpmen, and a few others are paid by the day at the rate of from 20 to 25 cents gold for ten hours. To see that they earn this overseers are stationed at the sides of the pits and at other strategic points. It is no use for the miner to wait for these bosses to turn their backs so he can take a few minutes off, because their backs are comfortably resting in easy chairs. With an awning overhead they sit in most un-American fashion with nothing to distract their attention from the work below. The coolies who carry the dirt cannot be supervised quite as closely, but they are paid in a different way. On each trip every man as he comes out of the pit receives a brass check. These are cashed in at the end of the day. A very industrious coolie, under this system, can make as much as 35 cents a day, while if he is lazy he can idle away as much time as he wants—at his own expense. Some parts of the work, such as building dykes, digging ditches, etc., are done on contract, each contractor hiring a few coolies whom he has to keep very busy if he wants anything left over for himself. Still another system of payment, and a very curious one, is used for a class of men known as "beggars." They wait around the mine and help when a few extra men are needed for some particularly heavy piece of work. In payment they are presented occasionally with a lump of the paystreak, the value of which is more or less according to whether their luck is with them or not. The washing of this gives them something to do while the work is slack, while the appeal to their gambling instinct, one suspects, induces them to work for less than they would otherwise demand.

All the men in the mine rest a half-hour in the middle of the morning and another half-hour in the afternoon, an arrangement that seems strangely like some of the methods the modern study of efficiency has introduced into American plants. It is admitted that a Korean can get more out of his countrymen than any foreigner can, perhaps because they have in the past been giving some of the attention to this problem that the foreigner has to the development of machinery. If we wonder how a mine run on such crude methods can be made to pay, probably the Korean manager would wonder still more how one of our mines, full of expensive machinery, can meet the interest and depreciation charges and the expense of repairs and have anything left over. At any rate this mine is being run at a profit. Some large native enterprises have been failures, but this was usually due more to the fact that the power pump could not handle enough water than to any shortcomings on their part as miners.

The Temple of the Four Patriots

In the 26th year of the reign of Emperor Kuang Hsü (1900) the "Boxers" created disturbances in China under the pretence of supporting the Ta-Ching dynasty to vanquish foreign nations. The uprising widely spread and, as is known to all interested in China, attacks by force were made on the foreign Legations at Peking. During those days of turmoil, Hsü Ching-ch'eng, Lien Yüan and Yüan Ch'ang held offices in the Chinese Foreign Office, known then as the Tsungli Yamên. Hsü Ching-ch'eng had for years held posts as Envoy Extraordinary and Minister Plenipotentiary abroad. He always encouraged junior members of the diplomatic service and preached to them the ideas of reform. He and Yüan Ch'ang were both well-known at that time because of their literary attainments and for their fearlessness in adhering to their principles. Hsü Yung-yi and Lien Yüan were also men of high principles, who shrank from flattering influential personages and nobles, and, with the others mentioned, seeing that the Court had lost its reason, sent memorials to the Throne showing the grave character of the situation and protesting in strictly open manner against the ill-founded arguments in favor of the Boxer movement. The few persons who were responsible for the outbreak of the uprising resented this attitude, took advantage of the situation, and did all they could to inflict the cruellest punishment upon them. The end was that all four patriots were martyred. The Boxer uprising having been suppressed, the Mànchu court issued an Imperial Edict exonerating the four martyrs from guilt, and in the first year of Hsuan T'ung, an Imperial Edict was promulgated granting postumous titles to them.

His Excellency Lou Tseng-tsiang, Minister of Foreign Affairs, has long appreciated the fact that these four far-sighted men did their utmost to maintain friendly intercourse between China and foreign countries, and that in their effort to prevent grave dangers befalling their country they suffered unheard-of grief and death. It is but fair to say, too, that they merit not only Mr. Lou's personal esteem, but also they deserve the respect of both Chinese and foreign peoples. Since the establishment of the Republican Government, Mr. Lou has held the portfolio of Minister of Foreign Affairs four times and has constantly looked for an opportunity permanently to honour these martyrs of the Chinese Diplomatic Service in order that coming generations may be constantly inspired by their noble example. Therefore last Spring, Minister Lou obtained the sanction of the President to erect at a site in the rear of the new Foreign Office Building, Peking, a temple in commemoration of the four martyrs, which is named "The Temple of The Four Patriots," wherein a precedent has since been established for the holding every year, in the Spring and Autumn, of memorial services by the staff of the Foreign Office headed by the Foreign Minister.

In the interior of the Temple, there hang the portraits of the four patriots, and in the east and west halls of the building there are engraved in stones the original draft of the memorial praying the Throne to give protection to the foreign Legations during the days of the Boxer trouble, written in Yüan Ch'ang's own hand; and also the text of Minister Lou's petition to the President for his official sanction of the tribute above described. By establishing this Temple it is hoped that Chinese and foreign visitors alike may share in the appreciation of the solemn esteem held by thoughtful Chinese for the four great men who ungrudgingly laid down their lives in order that the principles embraced by them may never perish.

The Principle and Practice of Exterritoriality in China

IS THERE ROOM FOR IMPROVEMENT?

By CHARLES DENBY, formerly U.S. Consul-General at Shanghai

For as old a China hand as the writer to pen anything about exterritoriality in China and its possible improvement is a very delicate task. It is necessary to begin with the statement that the writer does not purpose to suggest the abolition of exterritoriality nor the reduction in any way of its efficacy for the protection of foreign residents and foreign business. Exterritoriality is, however, one of the prominent phenomena of the relations between China and the foreign powers, and it, like every other item of such relations, may be the subject of criticism with a view to seeing how far it fits our present conditions: how far, if at all, it has departed from the expectations of the first treaty negotiators.

There is much in exterritorial practice in China which is misunderstood. The Chinese labor under an impression, to which expression is occasionally given, that the system of exterritoriality was imposed upon them by superior foreign knowledge and power for the purpose of securing some superior status for subjects of foreign powers in this country. Nothing could be further from the truth. In the first place, exterritoriality is not a novel feature of international relations. In some form or another it has existed for hundreds of years. It is, in fact, a feature of some of the heretofore most cherished doctrines of international law, the doctrine of allegiance, for instance, in which the individual took with him wherever he went the binding tie of allegiance to his sovereign and with this the reciprocal obligation of the sovereign to protect his subject. Exterritoriality was a familiar feature of the laws of the Venetian Republics which provided that their citizens should carry with them in their relations with adjacent countries the protection of Venetian nationality and Venetian law. It is a familiar feature of Chinese administration itself. The Buddhist clergy enjoy to this day wherever they may go the right to appeal to certain tribunals and to be tried under certain statutory regulations.

The allegation that exterritoriality was imposed upon China against her will or without her sufficient knowledge cannot be maintained. We read in such works as S. Wells Williams, "Middle Kingdom,"

> "that much against their will the people of China had been forced into political relations with foreign powers who had erected in China an *imperium in imperio*. The rulers of China," ' he says, "ignorant of the meaning of the principles of exterritorality, were tied down to observe them and found themselves within a few years humbled before those of their own subjects who had begun to look to foreigners for protection."

And in the work of Dr. Tyau, "Treaty Obligations between China and other States," we find similar sentiments.

We have, however, the testimony of the writer of the Life of Sir Harry Parkes (Vol. II, page 314) that the demand for exterritoriality from the Chinese was no novelty nor was it objected to in any respect, nor was it regarded as a concession to the foreign powers. In fact, we who have lived in China long enough to know the people know perfectly well that had the foreign powers wished to place their subjects under the laws of China when they made the first treaties with China this proposition would not have been entertained.

In this connection there arises an interesting inquiry. What would have been the condition to-day had we placed our people in China under Chinese law and had we compelled the Chinese to so modify their laws as to make foreign residence thereunder in this country possible. It is probable that our progress would have been very great. It is even possible to imagine we would have made such improvements in Chinese jurisprudence as to be a blessing to the people themselves and to have removed the barrier which now exists between the foreigner and the Chinese.

There is another feature of exterritoriality which is misunderstood. Residents in China who have no occasion to give much thought to these things are inclined to have an exaggerated regard for the exterritorial provisions of the treaties as the basis of protection in their business and social relations. It is certain, however, when the exterritorial provisions were placed in the Treaty of 1844 between the United States and China, the first treaty in which exterritoriality was distinctly postulated, that the American negotiators as well as the Chinese had no suspicion of the extent to which this provision was to go. They did not regard China then as they do now as a possible place of permanent residence for foreigners; as a country of enormously increasing commercial development; as a country in which under exterritoriality we were to find ourselves hampered at every turn. And it is this feature of exterritoriality which is the main purpose of this article.

What do we find to-day? The merchant who regarded the treaty port as his asylum and the exterritorial jurisdiction of his Government as his shield now finds himself no longer content to remain in the treaty port and to do business through his compradore. His business extends to the confines of the country; he becomes daily more directly in touch with the market throughout a continent. His representatives travel everywhere taking with them the protection of exterritoriality but far removed from any tribunal which could apply the same. The missionary has entirely outgrown exterritoriality; his mission stations are numerous, his consuls are few. In many cases he can neither sue nor be sued in treaty form without a voyage of great distance to some consular post. In return we find that he has the right to acquire property everywhere; he travels everywhere. His protection is as efficacious as though the Consul accompanied him. This movement is bound to extend. We are bound to feel more and more as time goes by that our exterritoriality and our treaty ports are handicaps which we carry around with us. We are going to feel more and more that if we could get in direct touch with these markets we could afford not to sacrifice but to materially modify the practice of our exterritoriality. It is stated even to-day that there are subjects of a certain power who regard with satisfaction these bonds which we still carry and who themselves overleap them and do business in the field outside of the barriers behind which we willingly remain. (See page 381 of Putnam Weale's "The Fight for the Republic in China.")

But this is not to suggest that we abolish exterritoriality and waive the protection of our Consular Courts. Is there not another way? Can we not keep the principle of exterritoriality and so modify its practice as to give us greater liberty and to maintain at the same time the fullest protection. The trouble with Consular courts is this: There are a number of different tribunals, one for every treaty power; the American appears as defendant in the American court, the Britisher as defendant in the British Court, the Dane, French and others likewise. We have then a great variety of codes applying in the same country. We create no possibility for the development of a legal procedure in which a judicial decision will have validity as a precedent except in the particular court in which it is pronounced. We have in our treaties (Treaty of 1903, Article XV) stipulated that when China shows herself able to provide a system which can replace exterritoriality we will abolish our Consular Courts, but we state no time nor day nor do we in fact contemplate any time in which this may be done. We have tied down China's judicial development to an uncertain epoch which we, really, do not contemplate as a possible achievement. It would be entirely possible to establish a code of laws controlling the legal relations of foreigners and Chinese so that independent foreign consular courts would disappear and that a tribunal created by China in co-operation with all the treaty powers could take the place of foreign consular tribunals throughout the country. It would be possible with intelligent co-operation on the part of the foreign powers to build up a judiciary in China which could handle all the cases of the various foreign subjects with as great a certainty of justice as they are handled by the Consular Courts to-day.

It is not necessary to go into the details as to how this could be done. In general we could encourage China to make a code applicable to foreign relations with the Chinese; to create tribunals with foreign co-operation to assist in carrying out this code; to put this system on trial for a sufficient number of years to assure that justice was being done under the supervision of the consular authorities before relinquishing exterritorial rights. In some such way as this we could hope to establish a code adopted to our relations with the Chinese, and to train judges and magistrates capable of enforcing the same. And here occurs one thought. How can we hope that China will learn anything of the control of foreigners in judicial matters without the practice? What happens to-day is, for example, that a merchant contracts for cotton goods from a British merchant. Some dispute arises which must be settled by a British decision and it is settled by a British Court. The next year the same merchant contracts for cotton goods from a merchant of another nationality. The same dispute arises as to the interpretation of the contract. The Chinese says "Well, I am sure of where I stand because I had a law suit with a British merchant last year and the Court decided in my favor." He may act on this presumption and on the matter coming up again before a court of another nationality he may find the decision of the court entirely different.

It is evident that with a variety of courts functioning under a variety of codes no one can tell exactly where he stands under a judicial decision rendered in a particular court. In fact a decision far from clearing up a commercial problem may only further confuse it.

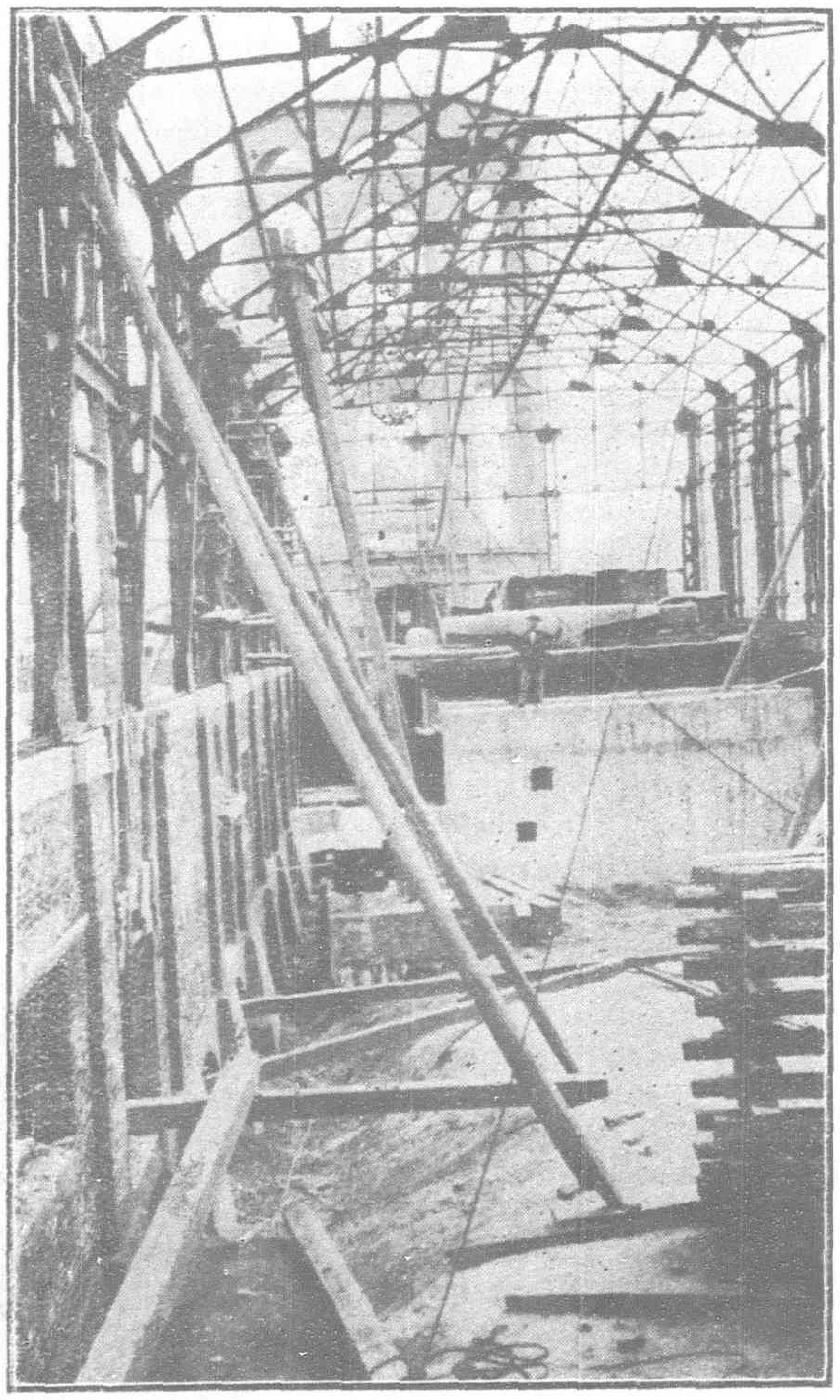
The question of sentiment comes in also in this matter. In the American treaty of 1903 it is provided that we will abolish exterritoriality on certain terms therein indicated. We have done nothing whatever to bring about the condition which will enable us to abolish exterritoriality. Are we, therefore, to assume the attitude that we will do nothing until we are forced to? Are we in effect to say to China that we are prepared to withdraw our consular jurisdiction but we are only going to do so when she is ready to force us and not when reason dictates? Are we in fact to say to China: "We abolished exterritoriality in Japan when Japan became strong enough to prevail upon us to do so. That to the appeal of might we are prepared to listen but not to the appeal of equity?"

Peking, October 28, 1918.

Industrial Electrical Development by the Chinese

New Plant at the Tayeh Iron Works

[By F. W. Allonby.]

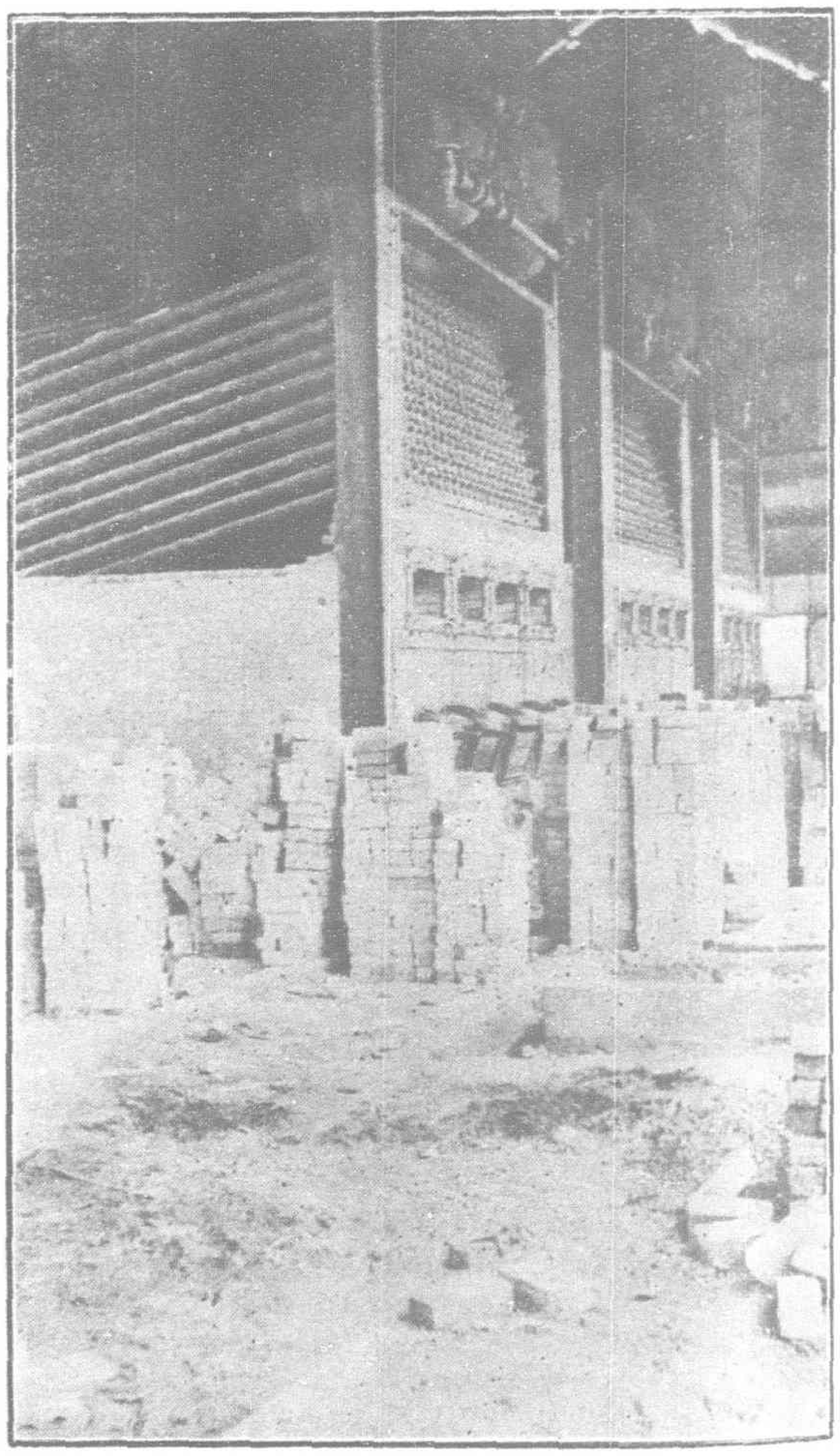


THE STRUCTURAL WORK OF THE MAIN GENERATING STATION WITH TURBO-ALTERNATOR FOUNDATIONS.

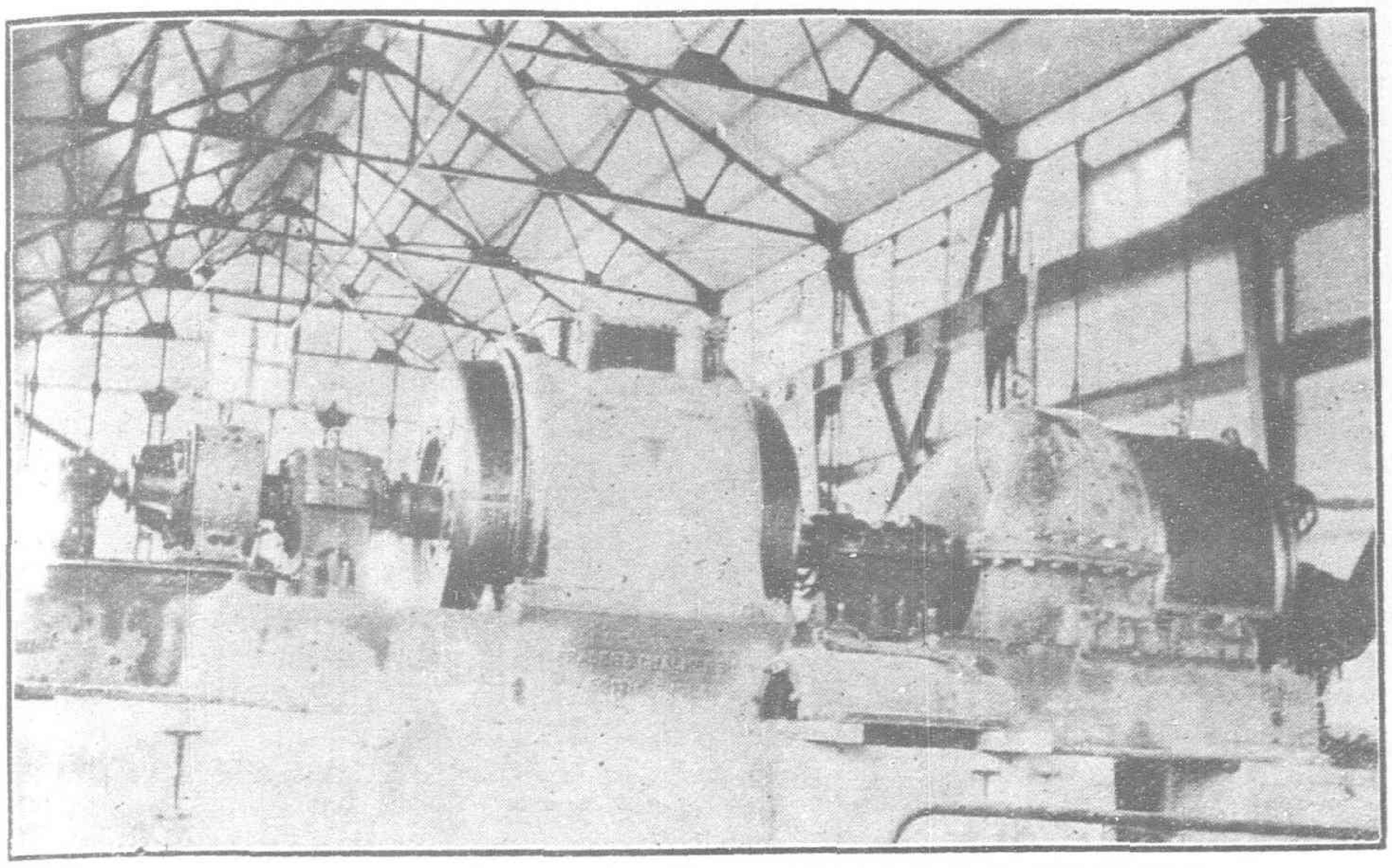
The application of electricity to industrial purposes in China proper may be said to be still in the realm of the imaginary when compared with the realities accomplished in this respect in Western countries. The following will take the form of an announcement of the birth of an electrical undertaking, which may, some day, rank amongst the finest private installations in the world.

On the banks of the Yangtze River between Shanghai and Hankow, the Hanyehping Iron & Coal Co., of Shanghai, are laying down a plant for the development of their Tayeh Iron Mines, and a new Iron and Steel Works, the constructional work for which is at present being carried out. The history of the pioneer work, if written up, would demonstrate undoubtedly the grit, determination, and ability, of a people who are frequently but quite mistakenly, deemed to be incapable. This article, however, is merely intended to describe the electrical outlay.

The object of the electrical undertaking is to provide the motive power for the operation of blast furnace hoists, pumping equipments, coal and ore handling plants, and all incidental



BABCOCK AND WILCOX'S BOILER DURING CONSTRUCTION.



ONE OF THE FRASER AND CHALMERS VICKERS TURBO-ALTERNATORS DURING ERECTION.

drives connected with a large iron and steel works; while further use will be made of the power to increase the output from the mines by the adoption of the latest types of power operated rock drills, ore crushers, and conveyors, etc.

The prime movers are steam turbines, supplied with superheated steam at 150-lbs. per sq. in. from a bank of five Babcock and Wilcox boilers, each with a steaming capacity of 15,000-lbs. per hour, and capable of being fired either by coal or gas. These boilers, together with their feed pumps and steam piping, have been installed entirely by Chinese contractors.

The feed pumps (in duplicate) by the Worthington Pump Co. are of the centrifugal type, driven by Terry steam turbines at 2,250 revs. per min., the steam exhaust from which after passing through a specially constructed "break up valve," serves as an extra feed water heater for the hot well. The make up water (taken from pure mountain drainage), will be treated for the prevention of corrosion and incrustation, and supplied to the hot well as required.

The main power units consist of three 1,500 K.W. steam turbines by Fraser and Chalmers, London, direct coupled to alternators by Vickers, Ltd., Sheffield. The turbines are of the impulse type, running at 3,000 R.P.M. and in addition to embodying the latest refinements of the makers of this class of turbine are specially designed for heavy service, and economy of operation, the speed and voltage fluctuations, due to rapid load variations are taken care of by a highly sensitive governor, while for power factor correction and load adjustment when the machine are operating in parallel, further adjustment is acquired by the governor valve, motor operated by push button control from the main switchboard.

The condensers by the Worthington Co. are of their surface type, and provide a cooling area of 3,600 square feet, for the condensation of 17,000-lbs. of steam per hour, with a vacuum of 27½ inches based on a circulating water temperature of 85°F.

The circulating, operating, and extraction pumps are all driven by a Terry steam turbine at 1,550 revs. per min., the exhaust from which is taken into the main turbine casing, and serves as a slight make up to the steam supply, while at the same time giving the Terry the benefit of the main turbine vacuum. The alternators by Vickers, Ltd., are of massive construction. They have been specially designed for heavy work and ample overload capacity; noteworthy features are the substantial anchoring of the stator end coils, and the rigid fixing of the slot linings and conductors, throughout the full core length, with the intention of preventing the pulverising of the insulation between turns due to mechanical vibrations.

The six ends of the stator winding are brought out and suitably mounted on a terminal board, for either star or delta connection. The ventilation of the machines is provided by pressure fans mounted on the rotor, and the air is cleaned by being drawn through dry air filters, designed and constructed on the site to suit local conditions.

The alternators have a rating of 1,875 K.V.A., or 1,500 K.W. At .80 power factor they generate at 5,250 volts, 50 cycles, 3-phase, with an excitation voltage of 120 volts. and the machines fully support the reputation of this well-known firm, for high-class material, and workmanship.

The switchgear layout provides for three generator panels, one exciter panel, five feeders, and two transformer panels. All high pressure apparatus is suitably mounted within concrete cubicles, remote from the operating board; the main switches are oil immersed single pole switches, in separate tanks, interconnected externally by a spindle and bell-cranks, and hand operated from the panel board through link mechanism. All H. T. apparatus is designed for satisfactory operation on 6,600 volt circuits.

The generator panels are mounted with Westinghouse watt meter type, reverse power relays, operating direct trips on the oil switches, graphic watt and volt meters, watt-hour meters, and ammeters reading the current in each phase by 3-way switches in the secondaries of the current transformers, synchronizing and volt meter plugs, governor control switches, and also a field switch for breaking the exciter field circuit.

The feeder circuits are protected by overload and low voltage trips, while the load is recorded by ammeters, graphic wattmeters, and watt-hour meters. The exciter panel mounts, shunt and series field switches, and rheostatic control mechanism, synchroscope, and station voltmeters are mounted on a swinging bracket, and are illuminated so as to be visible from the turbine stop valves, the voltage regulation is undertaken by a Brown Boverie automatic voltage regulator, and for the protection against atmospheric or other unbalanced surges, reliance is placed on choke coil and multi gap arrester gear.

A special feature of the installation and one calling for congratulations to the engineer responsible, is the transformation and transmission of approximately 1,000 K.W. at 22,000 volts., a distance of about 16 miles to the iron mines, by an overhead line. The line itself will run parallel to the railway, and is designed in three sections, with pole isolating switches mechanically operated from the ground. Electrolytic lightening arrestes are provided at each end for the efficient protection of all connected apparatus, while at the receiver end, two 400 B.H.P. synchronous motors (already installed) will be used for line power-factor correction, while in addition they will supply the mechanical power for two high speed reciprocating air compressors.

From the same sub-station outgoing feeders will supply power at 5,250 volts for ore crushing, conveying, and other auxiliary machinery.

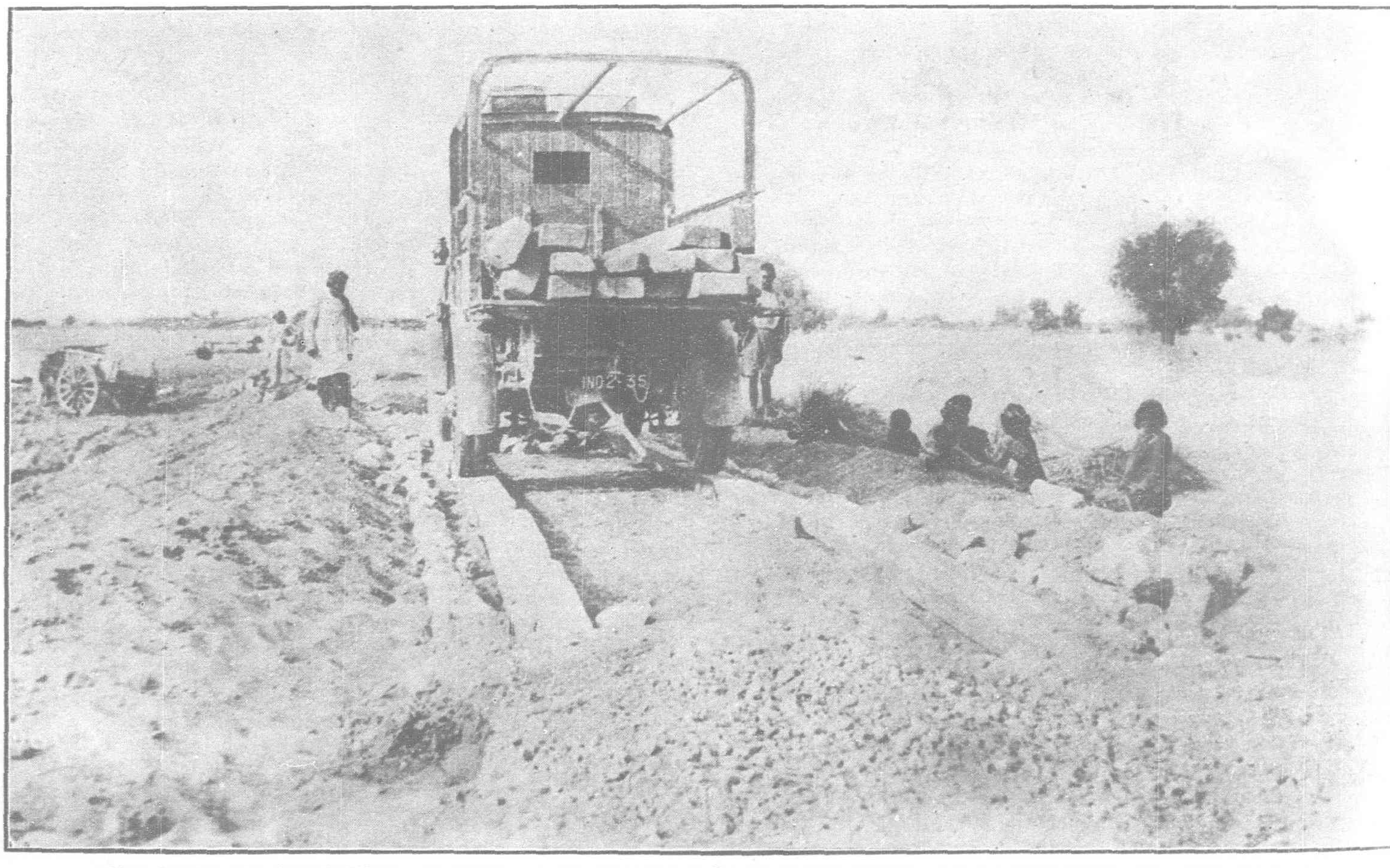
It is interesting to note that throughout the whole of the undertaking, all motors of 100 B.H.P. and upwards will be operated direct at 5,250 volts. To ensure continuity of service on the transmission line, transformers are installed in duplicate at either end, each of 1,875 K.V.A. capacity and connected so as to allow of their being changed over without interrupting the service. Great care and foresight has been shown by the Hanyehping Co., in the selection of the various apparatus and its installation, while special credit is due to their resident superintendent, for the smooth and efficient manner in which the whole work is being carried out.

Amongst those responsible for the realization of these enormous developments must be mentioned Dr. Z. T. K. Woo, Mr. S. Ken Huang and their associates, to all of whom I am indebted for the information which I have been able to gather.

Public Roads and Motor Vehicles in China

Projected Motor Routes to Open Inner Mongolia

In previous issues we have described the efforts being made by the Board of Communications of Peking and private commercial bodies to connect Kalgan and Urga with regular motor services. Initial difficulties have been encountered because of lack of proper organization and bad roads. Chinese chauffeurs who know nothing of motor science are for lack of supervision and care allowed to drive cars to death, and what the chauffeur who is careful and competent can manage to save the deplorable roads destroy. A road from Kalgan to the plateau must be built, and the bad portions of the trail across the wide expanses to Urga must be made fit for motor vehicles. There is a tendency on the part of the Government to shirk these essentials, and so discouraged were the promotors of the motor service when the winter closed down upon traffic that they contemplated withdrawing the cars and establishing in their stead a service of coaches—or rather tarantasses, as the vehicles used by the Russians are called. With three horses to a vehicle travelling by stages at a virtual gallop, it is estimated that the distance between Kalgan and Urga can be covered in ten days. With a car it takes four days in present circumstances, but with improved roads and organized stages it could easily be done in three or less; with the next fastest existing means of transport it takes from thirty to forty days. Mr. Yih Kung-cho, ex-Vice-President of the Board of Communications, who is perhaps the moving spirit in the introduction of cars for the opening up of the remote territories, realizes what the troubles are and is striving to overcome them. If the Government will take the utilization of unwanted soldiers properly in hand part of the difficulties can be removed by proper attention to road building, and once that is done the organization of stage journeys and chauffeur supervision can be effected. Mr. Yih Kung-cho does not intend to stop with a service between Kalgan and Urga if he can help it. He plans to try cars out on the road between Fengchen, the terminus of the railway from Peking, viâ Kalgan and Tatungfu, and Kweihwacheng and Paotou, on the Yellow River. A great deal of trade comes over this route as it is, but a properly organized motor service would develop it. Some idea of this route was given in a private letter to the Editor by Mr. Rodney Gilbert, the well-known writer, who has just travelled westward along it on his way to Turkestan. The distance from Fengchen to Kweihwacheng is 380 li, the first 30 or 40 li out of Fengchen being a gentle up-grade with a few small brooks to be bridged, but entailing no heavy construction work. The next 50 or 60 li to the north-east corner of the Tai Hai Tan, a lake (Taiha-nor on the map), is very hilly, badly cut up by streams and ravines. Then there is a fine stretch of about 30 li along the north shore of the lake, leading into very hilly country for about 120 li, the last 20 li being in a fairly smooth valley. The remaining 140 li to Kweihwa is a gentle down grade, with a few small streams to bridge. Kweihwa is in a dusty plain about 80 to 90 li across, with mountains visible in all directions. The country traversed is all under cultivation, even in the mountains. Along the Tai Hai Tan the ground looks very rich and fertile and the villages seem to overlap all the way round the lake. The scenery is pleasant but not wonderful. Kweihwacheng is the greatest camel town in China Proper. All the roads into Mongolia focus upon the place and the hides, furs, wool, liquorice, etc., etc., from northern Tibet and a good part of Mongolia pass through it en route to Tientsin. The town grew up around a Mongol lamasery



HOW ROADS ARE CONSTRUCTED IN INDIA. A THORNEYCROFT 2-TON HEAVY POWER LIGHT-CONSTRUCTED CAR USED BY THE INDIAN GOVERNMENT IN ROAD CONSTRUCTION OVER SANDY REGIONS.

which still exists. The Manchus built an official city a mile and a half to the east of the trading town, but business is all done in a big bazaar section south of the Chinese city and west of the Manchu city. Camels to the number of 75,000 are owned here, and they carry all the Chinese exports to Sinkiang and Western Mongolia. The liquorice, which developed into a trade when the Great War stopped supplies from the Near East, is now hauled on little solid wheeled carts pulled by one horse. Each cart carries three bales, and constitutes very cheap transport. The road through the Gobi leads out of Kweibwa to Kuchengtze, east of Urumchi, a distance of about 1,800 miles. Along it there are no houses, no permanent settlements, and precious little water. The country is not precisely desert, being what the Chinese call "grass land." and what the Mongols, who pretend to like it, describe as "sweet herb land." A laden camel requires 90 days to do the journey and a riding camel 55 days. To conduct a service of cars over this stretch would require rest stations and repair stations at frequent intervals, with thorough-going organization by a car and traffic expert.

There is no reason, of course, why motor experts should not be secured. Already on the route between Kalgan and Urga a great number of cars have been run and considering that the capital expenditure will be lost if experts are not employed to supervise the service it seems crass stupidity on the part of those responsible if they burk what they regard as the additional cost of organization and control, but which in reality is substantial insurance. It will be a long time before railways will traverse these territories, but that they will come some day is certain. If the Chinese Government would open up the country involved and would show itself to be progressive it would take the earliest possible opportunity to kill two birds with one stone: secure its hold upon the region and build a line to connect with the Siberian railway which will shorten the distance between Peking and London by some five or six days at least. China could secure great advantages by leading traffic across the Gobi from the Siberian line to either the seaport of Tientsin or Shanghai. Such a railway, combined with the system now operating and under construction would bring all parts of China, Hongkong, the Philippines, and Australia immeasurably closer to Europe in point of time than they ever can be otherwise. In the meantime, however, soldiers should be drafted to construct roads and a motor service properly organized ought to be installed, at least as far as the outlying trade centres. For what he has already done Mr. Yih Kung-cho deserves much approbation, and it is to be hoped that his plans will be consummated and at the same time assist to employ men now under arms who cannot be utilized to better purpose. Road building should be undertaken on modern lines and in this connection, for the information of the Chinese, we publish an illustration showing how work is carried on in India where sandy stretches as bad as any on the Gobi are made crossable.

Roadways in Hongkong

[BY CONSUL A. E. CARLETON, HONGKONG.]

For some years past the government of the colony of Hongkong has paid considerable attention to highways, both on the island of Hongkong and the territory on the mainland, and within the past three years great progress has been made in extending the road mileage. This progressive attitude received its impetus from the increasing demand of automobilists, not from the standpoint of business but from that of pleasure. The motor cars were originally confined to a few miles of highway on the island, but the insistent demands of the garages catering for pleasure seekers and the private owners of a few cars caused the government to make generous provision for a large extension of roads suitable for motor traffic. From a few miles of available highway the mileage has increased to 110, and 35 more miles are planned for. The colony has appropriated about $144,000 gold for maintenance of roads and $547,500 gold for new roads, the greater portion of which has already been spent. As soon as money is available the government will undertake further extensions.

On the island of Hongkong and to a considerable extent on the mainland the government is introducing asphaltic mixtures, such as asphaltic sand and carpeting laid upon Portland cement concrete foundations. These methods are proving successful. It is absolutely necessary to build as permanently as possible, as the climatic conditions, particularly the heavy rainfall, averaging 80 inches a year, demand the most thorough construction. The bridges on the roads constructed during the past few years are generally concrete, as steel bridges need a great deal of care, with a corresponding high cost for upkeep.

The nature of the roads on the island is such that motor cars can be employed in only a limited way; the use of trucks is therefore restricted, but there does not appear to be much demand for them. The method employed in moving merchandise from the docks to shops or for the transportation of other heavy articles is that of the two-wheel truck pulled by coolie. This method apparently serves the purpose, as Hongkong is not a manufacturing centre and the necessity of modern method in handling goods is not so apparent as it might seem, considering that the total population is approximately 500,000.

There are no customs duties on motor cars, as Hongkong is a free port, with the exception of duties on liquors and tobacco; and there are no local requirements other than the usual police regulations pertaining to speed, licensing of drivers, and similar restrictions.

The price of gasoline in the pre-war period was $7 Hongkong currency per case of 10 gallons, and the price at present is $9.50 Hongkong currency. Owing to difference of exchange the price now is 25 per cent. higher.

The following number of vehicles are licensed: Motor cars, 175; motor trucks, 5; hand trucks, 1,244; rickshaws, 2,642; and chairs, 869. The motor cars are practically all American; in fact, it might be stated that the American car dominates the Hongkong market. The garages prefer cars that will accommodate seven passengers, but the private owners prefer four-passenger cars. Of the total number of automobiles in the colony there are hardly half-a-dozen that are ever used for business purposes by their owners.

Manchuria Has Few Roads Suitable for Motoring

[BY CONSUL A. A. WILLIAMSON, DAIREN.]

There has not been much construction of roads suitable for motoring throughout Manchuria. Of course, many fairly good roads have been built, using the labor of the district through which the road runs; but few of these roads are suitable for motoring. At present there are but three places to which cars ordinarily go outside of Dairen, namely, Star Beach (Hoshigaura), a seaside place 5½ miles from the centre of Dairen; Rokotan, some 3 miles from the city limits; and Fukasho, a watering place about 6 miles out to the sea beach. The road to Star Beach was specially constructed for autos and rubber-tired vehicles and is a fine road. The other two were originally built by the Russians, and, while they have been kept in good trim, are not nearly so good as the first. Mud in the rainy season and dust and stones are the drawbacks. There is a fair road to Port Arthur, a distance of a little more than 33 miles by road, but one or two bad places prevent motor cars from using it. Doubtless this road will be improved in time.

The expenses for road building are all paid by the Government General and are contained in the annual budgets, but it is difficult to separate street from road building expenses. Considerable sums have been spent in improving city streets, and the streets of Dairen are now admirable. They are made of bluestone covered with hot tar and fine gravel, well rolled, and the effect is about the same as asphalt. Heavy cart traffic is limited to certain routes and streets. The Chinese cart is very destructive to good roads, and this will doubtless prevent much being done with country roads for some time to come. There are no noteworthy projects in the way of road building now under way.

Bridges are generally built of timber but are usually strong on account of the heavy carts. There is no difficulty with bridges, as there are few streams in this country, and the bridges are generally short, not exceeding 10 feet.

The usual method of transporting goods from place to place is by Chinese cart. This is a strong two-wheeled cart drawn by two or more mules or horses. Many good mules are seen in this district. The horses are of the Mongolian pony type. In the city, carts must have 4-inch tires.

There are now some fifty-odd passenger cars and two or three commercial vehicles in Dairen. The post office has one motor car for mail and the Yamato Hotel is expected to have one for bringing baggage from the wharf very shortly. Commercial automobiles or trucks do not seem to be in demand here.

Dairen is a free port, and no customs duty whatever is chargeable, by treaty with China. On goods going into the interior, across the boundary, the usual Chinese customs duty becomes leviable, not more than 5 per cent.

Practically all of the automobiles here are of American manufacture. The Government has recently put into force a system of registration with estimated values under which they may take over private cars in war time, if necessary, reimbursing the owner at the estimated value.

Public Highways and Transportation in Siam

[By Vice-Consul Carl C. Hansen, Bangkok.]

The southern part of the Siamese Kingdom mainly presents an extensive alluvial plain, which is often flooded during the rainy season, making interurban road building difficult and impracticable. Numerous canals, however, traverse this plain in every direction, and these waterways afford every facility for local travel and transportation. In the northern part of Siam and in the Siamese Malaya some road making is in progress in connection with the railway extension, but not of sufficient importance to indicate any extensive use of motor vehicles in the near future.

Besides the customary annual appropriations for the Department of Ways, there appears to have been no allotments made for special road making during last fiscal year.

In Bangkok, the capital, there are some 50 or more miles of macadamized roads and streets, which, together with the numerous and handsome ferroconcrete bridges, are kept in excellent condition for motor traffic. The number of registered motor vehicles in use here approximates 1,100, of which about 300 are trucks of from 1 to 2 tons capacity. The chief use of the latter is transportation of merchandise from the docks and for general delivery.

The prewar price of gasoline was 7 ticals ($3 gold) per case of 10 gallons, while at present the cost is about double that amount.

Nanchang-Kiukiang Railway Extension

[Commercial Attache A. W. Ferrin, Peking, China.]

The extension of the Nanchang-Kiukiang Railway from Nanchang, Kiangsi Province, to Foochow and Santuao in Fukien Province, is understood to be in negotiation between the Chinese Ministry of Communications and a representative of the Taiwan-Chosen-Industrial group of Japanese banks.

This railway, which was built by the Chinese of Kiangsi from 1904 to 1915 with funds borrowed from the Taiwan Bank (Yen 10,000,000 at 7 per cent.), runs 87 miles from Nanchang, Kiangsi, to Kiukiang, on the Yangtze River. It was originally intended to carry it southward from Nanchang to Shuichow, in Kwangtung, to connect with the Canton-Hankow Railway, or to Foochow and Santuao, or both, but lack of funds and the generally disturbed condition of China since 1911 have prevented the consummation of these plans.

By the terms of the Japanese loans the railroad was given as security, with the provision that if interest was defaulted three times beginning in 1915 the security should pass to the lenders. The road has not been so prosperous as was expected, owing largely to its incompleteness, and interest has been defaulted three times and will be soon defaulted a fourth. The lenders are in a position, therefore, to demand the delivery of the security but do not seem disposed to do so in view of the appeal of the Kiangsi people to the central Government for the nationalization of the line.

Proposed Loan and Extension to Santuao

The central Government, it is said, has approached the Japanese bankers for a nationalization loan which the banks are said to have agreed to advance, on condition that they be allowed to finance and supervise the extension of the road to Foochow and Santuao. That the Japanese have chosen this route rather than the extension to the Hankow line is due, apparently, to Japanese interests in Fukien Province, which lies opposite the Japanese island of Formosa, and also to the probability that such a route would begin to pay sooner than the Shuichow extension. In fact, it is believed that the Foochow extension will enable the road not only to carry the cost of the extension but the loan required to nationalize the portion of the road already built. The total amount required for both purposes is said to be in the neighbourhood of Yen 60,000,000.

The proposed extension, which was surveyed as long ago as 1905, will run from Nanchang past Chenchiang into Fukien Province, along the Tiu River to Yenping-fu, down the Min River to Foochow, thence northward along the coast to Santuao.

Ports of Foochow and Santuao

Foochow, the capital of Fukien Province, halfway between Shanghai and Hongkong, is a city of 500,000 inhabitants. It is a center of the South China tea trade and has been of commercial importance since 1842, when it was opened to foreign trade. It is also a great timber center and possesses a large dockyard and arsenal and other important enterprises. It has been declining somewhat as a port in recent years because of the lack of proper communication with the interior, which will be remedied by the construction of the proposed railway to Nanchang and the Yangtze River Its harbor is not so good as that of Santuao, 70 miles north. Foochow harbor is well protected, but large ships are obliged to anchor 9 miles below the city.

Santuao was opened to trade in 1899, but on account of the mountainous country behind it, which hampers the carriage to the port of tea and other products, it has not yet acquired great commercial value. The construction of the proposed railway extension will doubtless greatly increase its importance, possibly at the expense of Foochow.

Ramie Fibre in Formosa

The manager of one of the exporting firms in Taihoku, according to Consul Max D. Kirjassoff, Taihoku (Formosa), places the country's annual production of ramie at 2,500,000 kin (3,306,925-lbs.) In 1917, 267,000 kin (353,180-lbs.) were exported to Japan and about 2,000,000 kin (2,645,540-lbs.) to China and Hongkong. Ramie is grown pretty generally throughout the whole island, but the varieties produced in the Giran and Shinchiku districts are considered the best, and of these the so-called Giran variety is the better in quality. There are two harvests of the fiber a year, the first curing occurring in May and the second in August.

From 20,000 to 30,000 kin (roughly, 26,450-lbs. to 39,700-lbs. can be purchased at short notice, and now that the new crop is harvested, offers of quantities up to 60,000 kin (7,450-lbs.) may be obtained. The present price, f.o.b. Keelung, of Giran quality is Yen 34.50 per 100 kin, or, at the prevailing rate of exchange, about $13.56 per 100-lbs.; while Shinchiku "A" quality may be purchased at Yen 31 per 100 kin (about $12.19 per 100-lbs.).

Recently there was a famine of gasoline in the Philippines which was eventually relieved by the arrival of a vessel with a month's supply. Meanwhile gasoline rose to prices ranging from 50 to 80 pesos per case of two tins holding about ten gallons. Probably had there been a grave need for the fuel a boat would have been sent to Java, the source of supply in the Orient and only six days away by an ordinary vessel, but this was not done. As the annual consumption is not great, the Islands rely upon the regular sailings of trans-Pacific boats to bring their supply of petrol.

SORTING STRAW.

SORTING STRAW.

Strawbraid Making in Japan

The manufacture of strawbraid is one of the flourishing native industries of Japan, especially in Okayama, Kagawa, Hiroshima and other prefectures. The material used is wheat straw. Wood shavings and Manila hemp have also come to be used.

In point of production plaits of Manila hemp, according to the figures given in the Thirty-third Annual Statistical Report of the Department of Agriculture and Commerce for 1916, far surpassed in quantity and value other plaits made of straw and wood shavings. Whereas the production of straw plaits was given in the report as 15,492,894 bundles, valued at Yen 2,772,246, and that of plaits of wood shavings as 3,525,435 bundles, valued at Yen 280,936; in the case of plaits of Manila hemp, the quantity manufactured in the same year was 42,966,032, valued at Yen 11,001,717; that is nearly four times as much as the two other kinds of plaits put together. This is due mainly to the fact that in making Manila hemp plaits in Hyogo, Tokyo, and other prefectures, modern machinery is employed, whereas in making plaits of straw in country districts of Okayama, Kagawa and other prefectures human hands are mostly employed in a more or less old-fashioned way.

The making of straw plaits is the most interesting to describe here, as it will show how the country farmers, mostly women, girls and children, employ their full time or spare time, as the case may be, in making plaits during the season.

From the middle of August until January of the following year, the wheat is sown in the plait-making districts. The stalks of wheat, as they grow to their full height in May, are cut down about 10 days ahead of the ripening of the wheat. The stalks are then of a light yellow color. Sulphur is burnt, the stalks are smoked over it for about 12 hours and the smoked stalks are then dried in the sun for three days.

The stalks are cut into regulation length with scissors. There are three sections in a stalk which are generally used as material for plaits, called *sakibushi* (first joint), *nibushi* (second joint) and *sambushi* (third joint). The *sakibushi* is the longest and best as material, followed by the others in their natural order.

In May, June, and July, these smoked stalks, having been cut into regulation length, are woven after having been smoked and cut. But after the three months mentioned the stalks, as gathered from the fields, are soaked in a solution of soda, and then smoked with sulphur in order to bleach the material.

These sections of stalks, having been cut into regulation length, are then sliced lengthwise into several pieces, and the strips are either singly, doubly, or manifoldly used in weaving plaits, according to the different qualities of plaits into which they are to be woven. There are different names attached to these arrangements of material, such as marushibishi, katamarushibishi, hitoye shibishi, gokaku, sakishichikaku, chushichikaku, daishichikaku, awaseshineko, awasegoneko, shisuke, shihikkake, awaseshichineko, awasesampira, marugohira, awasegohira, awaseshichihira, awasekuhira, chusuke, hachiyoden, etc.

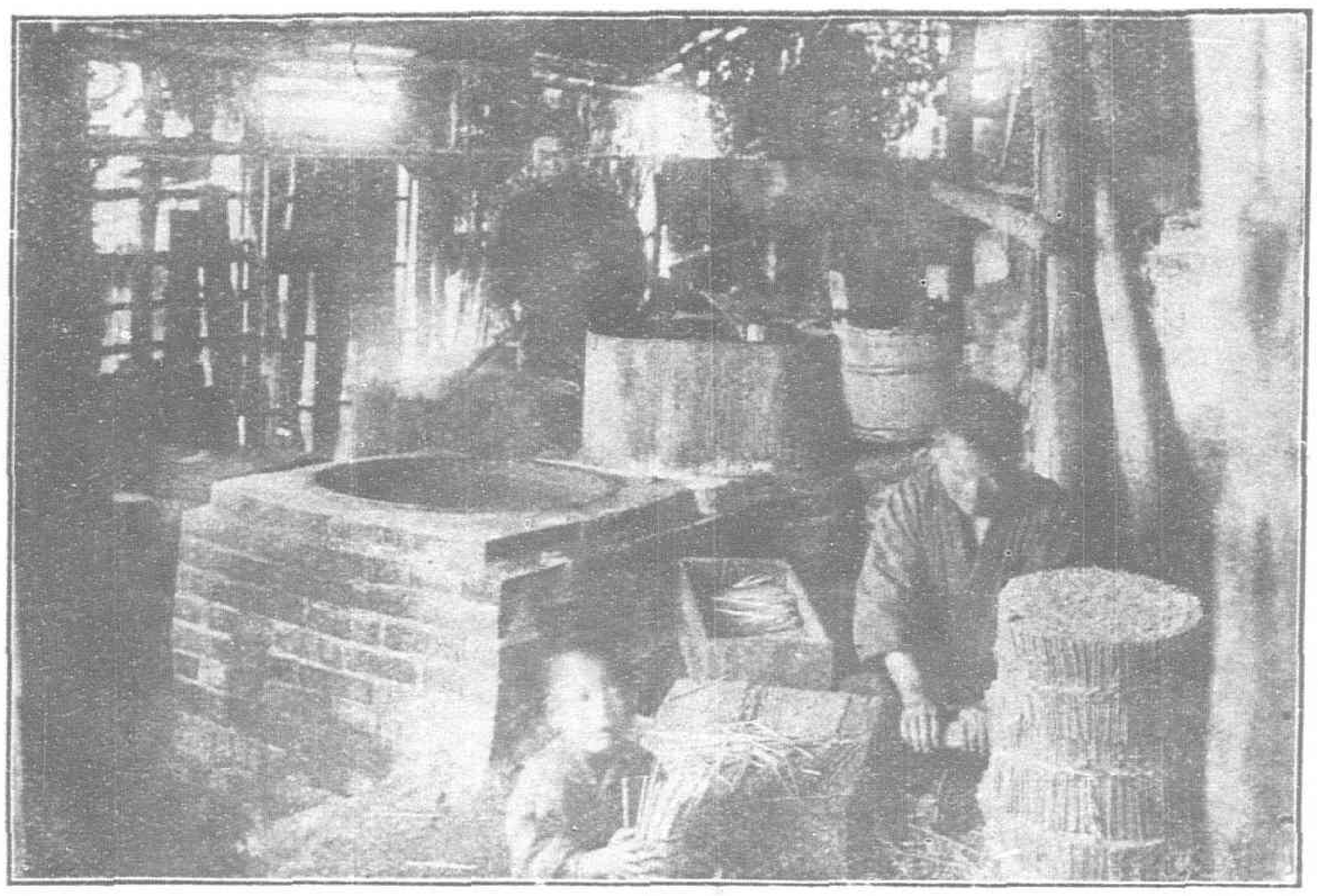
In the country strawbraid-making districts the farmers turn their farm houses into workshops to weave the plaits, being paid by the number of braids produced. Usually a girl makes 1½ *tan* (piece) a day of single slices. But in larger factories or workshops, where girls are employed altogether for the purpose, a girl makes about 2½ *tans* a day. These girls are usually employed by the year and get their board and room, and about Yen 20 to 50 at the end of a year. In Okayayama, Kagawa, Hiroshima and other strawbraid-making districts, the pupils of public schools are taught how to weave plaits and are paid for what they make, thereby being encouraged to cultivate the habit of thrift and industry.

TRIMMING STRAWS.

The farm houses and workshops which produce strawbraid generally sell their products to brokers, who, on their own responsibility, go around to buy them. There are some brokers who are agents of exporters. These brokers in turn employ their subagents in different localities. As the braid is thus bought, the brokers will deliver it to exporters in Kobe, Yokohama or other ports, or to firms which use them as material for hats which they make.

The Braid Exporters' Association of Kobe has published a table of figures for last year in which the quantity of straw plaits exported from Kobe alone is given as 16,282,393 bundles, valued at Yen 4,037,502; that of wood shavings plaits as 6,856,520, valued at Yen 906,926; that of Manila hemp as 12,900,511, valued at Yen 4,726,139; and that of miscellaneous plaits as 13,260, valued at Yen 26,580; totalling 35,961,684 bundles, valued at Yen 9,697,147. As this amount for 1917 is represented to be an increase of over Yen 2,000,000 from that of 1916 for Kobe, it is estimated that the amount of production in all Japan must have made a considerable increase in 1917 over 1916.

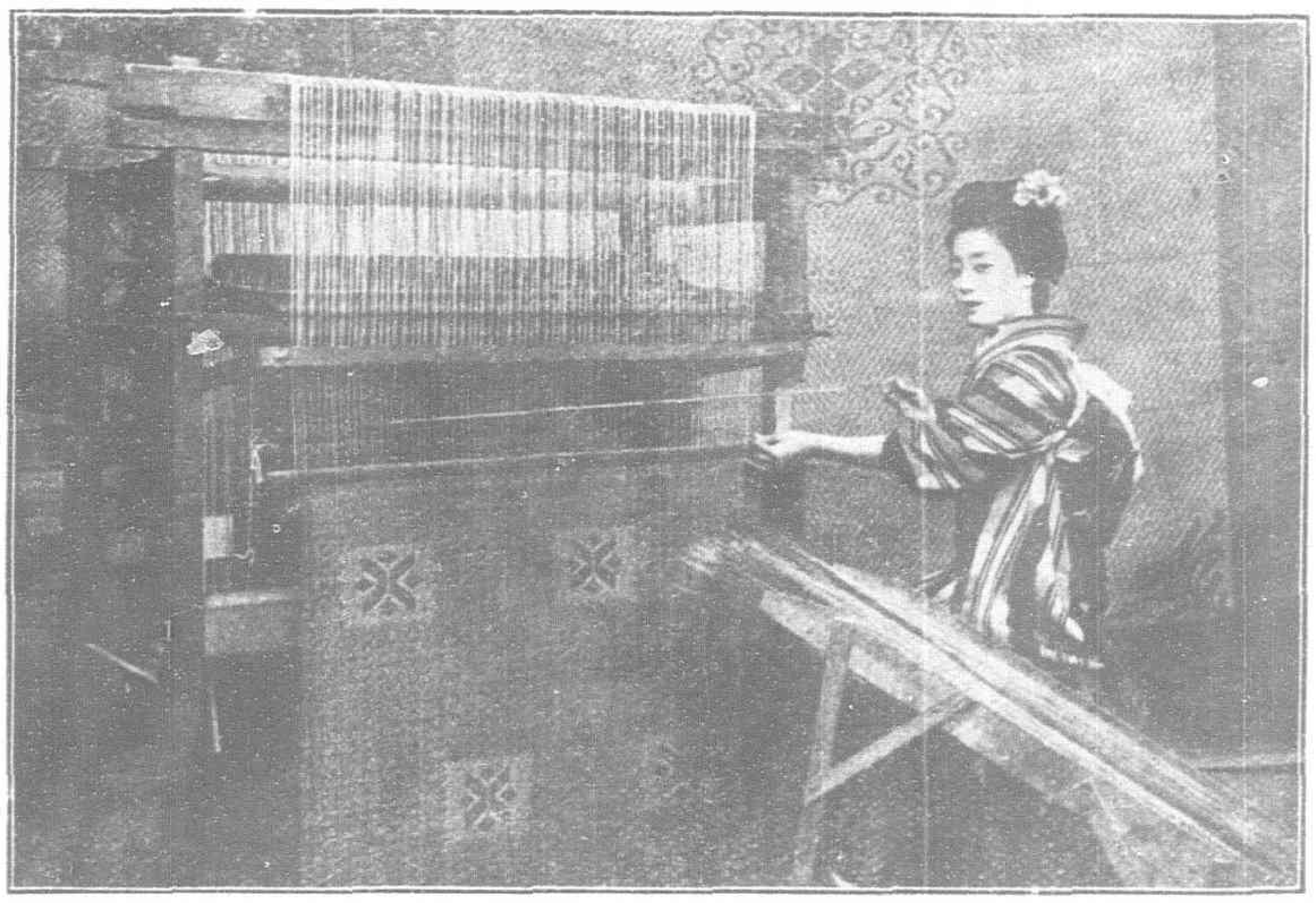
A report has been received in Japan that the Manila hemp plaits which have been used as material for hats for women in America have of late gone out of taste, because of their uniformity in weaving. The American women want something different now and their taste is reverting to straw plaits. The market for hemp plaits, while it is now in season, is very dull, not only in America but elsewhere as well. It is therefore expected here that the demand for straw plaits, especially of novel weaving, will increase considerably in future.



PACKING STRAW.

PLAITING STRAW BRAID.

WEAVING STRAW BRAID.



WEAVING A JAPANESE MAT.

Bank of Korea

A general meeting of shareholders in the Bank of Korea (Bank of Chosen) was held at the Bankers' Club, Tokio, and passed the following statement of accounts for the last terms:—

Net profit	Y.1,227,685
Brought forward	293,022
Total... ...	Y.1,550,707
To Reserve against loss	Y. 400,000
Reserve for equalizing dividends ...	30,000
Bonuses and social expenses	75,000
Dividend, 6 per cent.	519,041
Extra dividend, 2 per cent.	173,013
Carried forward	353,633

The rate of dividend is the same as for the preceding term. The meeting also passed a proposal to double the capital of the bank to Y.40,000,000. Of the 200,000 new shares 170,000 will be allotted to the shareholders registered on September 2, 1918, and the remaining 30,000 will be offered for public subscription at a premium.

Last year the capital of the Bank of Korea was increased from Y.10,000,000 to Y.20,000,000, and it has now been decided again to double it to Y.40,000,000. The increase in capital is due to the extended operations of the bank. A director of this semi-official concern is quoted by the "Keijo Nippon" as saying, according to the "Japan Chronicle's" translation:—

"It has become necessary further to extend the operations of the bank in Manchuria and Siberia, for which increased funds are naturally necessary. It has already branches at Shanghai and Tsingtao, and it is now proposed to establish more offices at Tientsin and Tsinan.

"Moreover, the bank has been endeavoring since the year before last—in accordance with the policy of the Government—to advance loans to China either in co-operation with other Syndicate Banks or independently, and now contemplates the continuance or extension of this operation. The field in Russia is also engaging the attention of the bank; it is thought that after the war it will behove Russian and Japanese financiers to co-operate, and for this purpose the Bank of Korea will have to take the lead among Japanese banks in view of the geographical position of the peninsula.

"Another reason for the increase of capital is the contemplated extension of exchange business. It is thought that the bank will have to open branches in London, New York, and somewhere in India."

The Far Eastern Review

A Monthly Review of Far Eastern Trade, Finance and Engineering, Dedicated to the Industrial Development and Advancement of Trade in Far Eastern Countries

ENGINEERING FINANCE COMMERCE

5 JINKEE ROAD, SHANGHAI, CHINA
Telegraphic Address: Farview, Shanghai

Address all Correspondence to

FAR EASTERN REVIEW, 5 Jinkee Road, Shanghai, China

PEKING OFFICE.—23 Tsung-pu Hutung, East

JAPAN OFFICE, Sale and Frazar, Ltd., TOKYO.

MANILA.—Fleming, Percy Smith and Seth, Roxas Building, Room 217-218, Escolta, Binondo, P. O. Box, 214.

UNITED STATES.—J. ROLAND KAY CO., Conway Building, Chicago

GREAT BRITAIN AND CONTINENT.—SOLE ADVERTISING AGENTS WALTER JUDD, LTD., 97 Gresham Street, Bank, London, E.C.

SUBSCRIPTION RATES: China, Mex. $9 per year. Philippines, United States, Canada, and Mexico, $3.50 U. S. C. per year. To all other countries in the Postal Union, Mex. $8 per year, postage $2 Mex. extra. Single copies 40 cents U. S. C. or 80 cents Mex.

ADVERTISING RATES will be mailed on application.

Entered at the U.S. Postal Agency, Shanghai, China, as Second Class Matter. Registered at the Chinese Post Office as a Newspaper.

SHANGHAI, DECEMBER, 1918

The Development of Yunnan

During the last two years the Southern provinces of China have made themselves unduly conspicuous by their rebellion against the authorities at Peking. Canton has been the headquarters of the movement; the Southern Capital has maintained its unenviable reputation as a centre of turmoil and unrest; and Kwangtung, as a Province, has been in a very disturbed state. The Cantonese are, indeed, to China, what the Irish are to the British Empire in many respects, although they have a remarkable business acumen that makes them prominent as merchants in all parts of the world. Politically, however, the province of Kwangtung is like Ireland. It is always in a state of insubordination. It was the starting point of the great Taiping rebellion and it was always the home of intrigue against Peking. But the natives of Yunnan are not Cantonese; they are as different to the people in Canton as is a Dutchman to a Swede. The Yunnanese speak the Mandarin dialect; they do not scheme and intrigue; they are generally peaceful and law abiding. They have joined the other Southern provinces in the revolt against Peking but it must be remembered that General Tang is a Yunnanese and no doubt his personal influence in his own province is very great. The people of Yunnan province are, however, naturally of a peaceful disposition; they are quite friendly to visitors and the latest advices assure us that they want to encourage the development of the natural resources of the province.

It was with that object in view that some of the local "returned students" of Yunnan recently met together in Yunnanfu and took the initiative in the formation of a Chamber of Industry. They received encouragement from the local officials, and the Civil Governor is the Honorary President of the Chamber. The Director of Financial Affairs is the President. Most of the members of the Chamber speak English. Many of them are returned students from Japan. The Chamber has already arranged to publish a magazine four times a year, and the general objects will have the sympathy of all true friends of China. For their objects are to promote the industrial development of the province, to stimulate and to improve trade between Yunnan and the outside world. Agriculture and afforestation are subjects which will receive attention, and a bazaar of native and foreign products is a practical suggestion which we hope will succeed. Above all else it is good to know that the members of this new Chamber of Industry realize that the first problem that must be solved is that of communications. More railways and more roads are needed in the province. It is said that the Government wants to build motor roads and the only thing needed is the capital. The chief project is a road from Yunnanfu to Talifu. At present the journey takes fifteen days by chair. With a good motor road it would probably be done in as many hours. Although the province is very mountainous yet this particular road would not be very expensive.

In the matter of railways the Government of the province employed a well-known American engineer, M. W. S. Dowley, of Chicago, to make preliminary surveys. They wisely paid him a very good salary and he did admirable work during his four years with them. It is said that he was very popular, but he resigned because of the difficulty in obtaining capital. Various railway lines in Yunnan are under consideration. The only one operating at present is the French line from French Indo-China. It cannot be said to be a satisfactory means of transport because of breakdowns caused by the very mountainous nature of the country through which it passes.

The three railways we should like to see carried out as quickly as is possible are (*a*) the line to Burmah (*b*) the line to Kwangsi and (*c*) the line into the province of Szechuan. It is very difficult to say off hand whether any of these trade routes could be better served by roads suitable for motor traffic. The railways can be more easily financed and have certain definite advantages, especially in a province of which the mineral wealth is very great. It is, however, not without interest to note that some of the more influential of the Yunnanese are anxious to see roads developed in that province.

There recently arrived in Yunnan four American mining engineers who have taken into their employ local returned students, and they have created what is called in political circles "a good atmosphere." Of the Americans, a local official recently used the significant words "They are welcome." There are already mining operations in the province, and during the last few months a great deal of tin has been exported. There is plenty of coal, and anthracite is being sold at present at about seven dollars a ton. The water power of the province is very considerable. A commencement has been made to utilize that source of natural energy and no doubt the hydro-electric installation for supplying current to Yunnanfu is one of the best possible arguments in favor of further similar installations.

We may therefore expect to see, in the near future, considerable developments in Yunnan. The great factor in favor of it is the attitude of the merchants and officials toward modern methods. They believe in Western science, and that is a very great advance. It may be that, in common with so many officials in China, they overestimate the immediate returns that may reasonably be expected from industrial undertakings. However, they have wisely taken experienced foreign experts into their confidence. We do not forget that the province of Szechuan contains much more mineral wealth then Yunnan, but we hope that every encouragement will be given to those who wish to commence work at once in Yunnan. The result of an example of success in that province will be immense. It will be the finest propaganda in Southern China, for the tale of how money is made spreads quickly along the trade routes. We wish all good fortune to the pioneers of whatever nation who are working for the industrial development of Yunnan. In particular we are glad to see that the local officials are concerning themselves in a practical manner with the movement. If they succeed there will soon be a good market for machinery of all sorts in the province. There are already up-to-date waterworks and an electricity supply plant for Yunnanfu. That is, we are sure, only a commencement. The big demand will be for mining machinery.

China's Railways

Now that the war is over it is to be hoped the Board of Communications at Peking will make strenuous efforts to reinforce the rolling stock on the various lines operating under its ægis. The chronic shortage of locomotives and cars of all kinds has for years practically paralyzed the officials responsible for the conduct of railway traffic; has produced erratic services both for freight and passengers, and has resulted in a great loss of possible revenue. Added to the disabilities caused by increased commercial demands is the callous disregard of public requirements by the militarists who seize and hold rolling stock on every northern line whenever the fit takes them to career about the country with their forces. This perhaps is the worst feature of the whole sorry business. Civil war from 1911 onwards was primarily responsible for car and engine shortage because the funds which might have been devoted to purchases were diverted to carry on the absurd internecine struggle, and the supervening Great War augmented difficulties by preventing purchases upon a reasonable basis during the first two years and virtually completely stopped fulfilment of orders from America and Great Britain during the latter two years, irrespective of the amount of money that might have been offered for material. Confusion was made worse confounded by the resumption of civil war in 1915-16 and 1917-18 and the consequent seizure by militarists of all the equipment desired by them. Troops were transported from one place to another to the detriment of all commercial and public business, and trains were converted into mobile barracks and held in sidings for months at a time, and are at this moment still being illegitimately detained and occupied by useless troops. At no time during the past couple of years could the railway authorities be certain of operating to any schedule on any northern line for any sustained period, with the result that even the equipment available was prevented from earning anything near its full capacity. Produce offering after the harvests could only be shifted with difficulty; much of it could not be handled at all. The railways lost heavily as did the farmers who were unable to reach the markets with their crops—and consumers correspondingly could not be accorded the advantage that well-stocked markets would have offered.

Most regrettable, however, is the fact that the railways were unable to take full advantage of the augmented business offering as a result of the increase of steamer rates. The shortage of shipping caused by the war, and the consequent increase in freight rates both on ocean and river vessels, produced a situation where it was cheaper for grain dealers in the regions tapped by the railways from Tientsin to Pukow and Nanking to Shanghai to transport their produce to Shanghai by rail. Increasing cargoes consequently completely staggered the under-equipped Shanghai-Nanking railway with the result that the wharves at Pukow quickly became congested, the godowns and railway yards filled, and arriving grain could not be taken off trucks which were forced to lay up for days waiting the frantic efforts of the Shanghai-Nanking railway, strenuously working insufficient equipment, to cope with the demand for space. This situation further embarrassed the Tientsin-Pukow railway authorities who simply had to shut down on cargoes pending the release of accommodation at their Pukow terminal.

Both the railways mentioned did yeoman service with the limited rolling stock at their command, but the magnificent chance of record earnings offering had to an extent to be allowed to pass.

Passenger services on all lines likewise suffered. Travel on the Tientsin Pukow railway in particular became an adventure. Never could a train be guaranteed to arrive at its destination anywhere near on time; never could the comfort of travellers be assured. Ill-kempt soldiers boarded the trains without paying fares; swamped the compartments; converted dining-cars into sleeping rooms, day and night; made themselves objectionable to all passengers, Chinese or foreign, and rendered the equipment filthy and unfit for occupation by decent people. Military officers stopped and held up trains to suit their whims; brigands caused constant delays, and ultimately, about the middle of November the railway authorities were compelled to alter the timing of the passenger trains from Tientsin to Pukow, and *vice-versa*, to avoid running through the dangerous areas in Shantung Province during the night. The service was thus made slower and more inconvenient to all travellers. The result of this continuous uncertainty and unsatisfactoriness drove people desirous of travelling from Shanghai to the north, or *vice-versa* in comfort and safety, back to the slower steamers. Even with this diversion of passengers, however, the accommodation was insufficient, nor could it be improved owing to shortage of passenger coaches and locomotives. It was hoped long ago to initiate a direct express service from Peking to Pukow, but at no time were locomotives and cars certain to be available, and the scheme had to be postponed time after time. Plans are now being made to begin the service shortly, the ending of the war in Europe and the cessation of hostilities in China encouraging the optimists to believe that the unsatisfactory conditions of the past four or five years will now be minimised if not eradicated altogether. To put on a daily express train from Peking will, however, further hit the freight traffic for it will mean taking a number of locomotives from that service, while it will place a further strain on the passenger equipment now available. There is room for great improvement on every railway in China. Business is continually increasing despite obstructions, and all rolling stock is worked to its uttermost limit; there is not a modern express train on any line, and there is certainly an insistent call for the establishment of such if China is to cater for the increased business which is expected as a result of the termination of the European conflict. If the Board of Communications is wise it will take advantage of present efforts to establish a stable government to have the railways placed under control which will be free from military interference. What is wanted most, of course, is the total reorganization of the army, the abolition of irresponsible Military-Governors in the provinces, and the punishment of any soldier who dares to act on any railway contrary to regulations. Coincident with effort in this direction steps should be taken to acquire sufficient rolling stock to enable the inauguration of services capable of handling all traffic—freight or passenger—according to up-to-date methods.

Japan's Minister at Peking

The retirement of Baron Hayashi as Japanese Minister at Peking has given rise to considerable speculation among the newspapers of Japan with regard to Japan's future policy in China; and the appointment of Mr. Obata, of the Tokyo Foreign Office, as Minister in his stead, has been accepted by a large section of the press of Japan as indicating that a change of method, if not of policy, will be inaugurated. The Chinese press construed the appointment to mean that Japan intends to continue a forceful attitude, citing in support of that belief, the fact that Mr. Obata took up a strong stand at the time of the notorious Twenty-one Demands. He was then Councillor at the Legation in Peking. Some Chinese papers were highly indignant at the appointment and denounced the new nominee as being *persona non grata*. Others were offensive in their comments and counselled the "people of China" to refuse to receive Mr. Obata. The Peking Government does not seem to have been moved by the advice of the newspapers, for it is reported to have expressed pleasure at the appointment. In the meantime, however, Mr. Obata's departure from Tokyo has been delayed by illness.

Now that Baron Hayashi is departing the results of what is described in some Japanese papers as "his policy" are being reviewed, and in many quarters he is denounced for being "pro-Tuan" in his attitude. He is blamed for rendering possible the various loans which went to support the northern militarists, and of being a consistent supporter of Premier Tuan Chi-jui and his war on the south policy. If that is so then Baron Hayashi succeeded very well in camouflaging his real thoughts. While in Peking he professed great apprehension as to the results of the loan policy which kept the pockets of the militarists filled, and at times was strong in his denunciation of the attitude of those of his countrymen who were responsible for that policy.

There is no reason to believe that Baron Hayashi personally was insincere in this respect, and evidence that he was not responsible as Minister for the policy is given in many quarters in Japan, and was summed up by Mr. Imai, a member of the Diet, who recently pointed out that "there has been a singular lack of uniformity in Japanese policy towards China. The Finance Department in Tokyo has pursued a China policy of its own, while the military authorities have followed a policy of their own, these two lines again being often at cross purposes with the policy followed by the Foreign Office." This statement, made presumably by a responsible man, seems to exonerate Baron Hayashi. Apparently there were so many policies that he had no opportunity of introducing one of his own, and mostly what the other policy promotors were doing was unknown to him, since free-lance, or independent, financial agents were active in Peking and apparently possessed powers of action enabling them to operate without reference to Baron Hayashi as Minister. Why he should now be attacked it is difficult to understand, unless, of course, it is the intention of someone to find a scrapegoat. Mr. Ogawa, a leading member of the Seiyukai, commenting on Japan's policy towards China says "It is most important that the Japanese Government should formulate its policy along the lines of mutual love, mutual respect, and mutual interest," and he hopes that the appointment of the new Minister "will serve to remove all misunderstandings hitherto existing between the two countries." This latter pious hope does not seem likely to be consummated if the opinions expressed in the Chinese newspapers regarding Mr. Obata's qualifications are to be taken as a criterion. One thing, however, is certain, and that is that the creation or development of the recent policy cannot be placed at the door of Baron Hayashi, as certain factions in Japan are trying to do. That is political deception of the worst possible kind. The policy which has recently been followed by Japan in China is not a creditable one, but it is too late in the day for those concerned to try and shirk responsibility. Perhaps it is hoped that Mr. Obata will decline to be made sport of by the various departments in Japan that wish to impose their own ideas through their own media upon China; and perchance that is what he has in mind when he calls for a unified policy and a consistent one. Whatever is at the bottom of the business China has good reason to be apprehensive, though the end of the war will have a material effect upon all national policies not only in Europe but in the Far East as well.

China and the Peace Conference

The first shot in the campaign for consideration of China's claims at the coming Peace Conference has been fired by a group of residents in Peking hailing from Shantung Province. At a recent meeting, where foregathered a number of Chinese particularly interested in eventually seeing a practical application of Allied war aims to China, the Shantung provincials presented a prepared programme of desiderata. The programme constitutes interesting reading in view of the international situation in China, and embraces a number of questions which China is undoubtedly entitled to raise as a "weak nation" which has been imposed upon by strong ones. The Shantung promotors of the gathering believe that if the Allies have been really honest in their declarations during the past few years of warfare they will agree to

1. The restoration of Tsingtao to China by Japan;
2. The handing over of German interests in Shantung to China and not to Japan;
3. The restoration of the Chinese Eastern Railway to China by Russia without interference by Japan or any other Power;
4. The cancellation of exterritoriality in China;
5. The withdrawal of foreign garrisons from China;
6. The granting to China of the right to adjust her own duties and taxes, without interference from foreign Powers;
7. The cancellation of all secret agreements and treaties which have been signed by Chinese militarists with Japanese capitalists, with or without the consent of the Tokyo Government;
8. The residence of foreigners in interior cities of China without concessions or settlements or spheres of influence;
9. The establishment of equal rights of commerce and intercourse in the Republic of China; and
10. The revision of all former one-sided treaties with foreign Powers because they were signed by pressure of armed force or threats of invasion when the Chinese Government authorities knew nothing about diplomacy or intercourse with foreigners.

Even if it may be contended by some that China is not entitled to outright concessions such as are suggested in these questions the publication of them as an expression of the wishes of certain Chinese invests them with sufficient importance to make them a basis for discussion. Those foreigners who know China and the Chinese expect that a supreme effort will be made by them at this important juncture in international relationships to secure an adjustment of every grievance under which they deem they labor—whether those grievances are real and substantial ones or not. That considerable heart-burning will be generated among the various Powers immediately Far Eastern problems come up for consideration is as certain as that the moon is not made of green cheese, but whatever the situation may be it will have to be faced.

For years China endeavored to resist the effects of world movements and failed to understand them; in the past the bleareyed mandarinate stubbornly resisted every friendly overture, obstructed every genuine attempt by foreigners to help in reforms, and conspired to exclude every innovation savoring of "foreign devilism." It was not until the latter years of Manchu domination that the importance of foreign methods was realized, and not until the effete rulers of China were overthrown by the revolutionists in 1911 that there was any chance of Occidental means of progress being appreciated and applied. The obstruction of the old days led to conditions being imposed upon China for her own ultimate good which are now regarded as grievances; and the continual unrest and strife which have existed in the country for the past ten years have prevented those Chinese who would adapt western methods to the government and development of China from exercising their judgment or putting into operation policies based on the administrative reforms and scientific and economic developments which are the foundations upon which the well-being of the great democratic nations stands. China has not yet whole-heartedly received what the democratic world has offered and has to offer, but she is fighting her way to that end. At first she was compelled by force to open the doors she would keep closed, later she tolerated the intrusion of foreign representatives because she learned to respect the power behind them, but very recently she has shown a disposition to realize what the outer democratic nations aim at in the conduct of their own affairs.

The education of China has been a long process, and as the recalcitrant, stubborn child has to be disciplined so had China in her own good to be disciplined. But when the stupidity is birched out of the baby and it grows to sensible adolescence the birch is burned and is supplanted by kindly encouragement; every evidence of enlightenment is applauded, and more and more efforts are made to ripen the budding appreciation of the aims of its mentors. Praise takes the place of punishment, and when the reformed recalcitrant has demonstrated determination to down and oust the devils which has blinded its perception and darkened its intelligence assistance is rendered to enable it to stand upon its own feet, start in business on its own account, and take its place as a useful member of the community. The penalties imposed in its swaddling days and, during the period of its wicked youth are not persisted in during the struggle made to assert its manhood. They are removed, kept from sight, banished. China may well be likened to a recalcitrant child which has required stern measures properly to educate it, and because of that she deserves the considerate treatment which would be accorded the growing man whose smarts of pain have begat reason and produced desire to down the evils which possessed him, unless of course China is to be penalized for not being as sensible as the enlightened powers which in the old days were constrained to use the birch in educating her. If it is conceded—as it must be—that China has succeeded in a measure in extirpating the devils of ignorance, obscurantism, and crass folly which dominated and swayed her years ago; if it is admitted that China is struggling, be it ever so slowly, up the steeps leading to the broad democratic outlook which animates the great Powers to-day; and if it is the policy of this new world to help the weak, then the time has really come when she may reasonably ask for direct assistance and encouragement in the effort being made to supplant the short-sighted militarists who are clinging to her neck like a millstone, and for the removal of the systems of discipline imposed by foreign nations upon her years ago, and which to-day are construed by thinking Chinese as outrages upon every principle of liberty espoused by those nations during the past four years of war.

China to-day stands enlightened when compared with the old systems which the pioneering nations fought, and the fullest recognition should be given to the claims of a vast congeries of people who are peacefully inclined, industrious, and free from blame for any of the acts of the criminal mandarinate which controlled their destinies up to 1911, and the power-seeking militarists who have since then made the name of the country a bye-word. The Chinese people struggling for an existence, securing no help from their alleged governments of the past to ameliorate the difficult conditions under which they live will be further penalized by any act of foreign nations which renders it impossible for those of them who are enlightened to shake off the past; and, indeed, adherence to old impositions by foreign nations will simply aid and abet the very obstructionists of modern methods who have so far succeeded in preventing the public direction of the affairs of the State. China has lost her independence, or has been deprived of it, solely because certain men have been able to seize upon the power of the State and misdirect it, but those men are gradually being borne under by the gradual growth of enlightened public opinion. The development of a public opinion in China has been slow to be sure, but it is growing. And its growth is signalized by the establishment of a Republic which the democratic world has applauded. That Republican principles have not developed as they should have done is not the fault of those who inaugurated the movement which has made what has been accomplished possible, so much as it is the fault of those who have availed themselves of circumstances to seize and misuse and misdirect authority. Happily these misguided men are swiftly losing their grip on the opportunity which favored them, and the acts which they have committed contrary to international ethics and public right have neither been sanctioned by majority nor by law. By the exercise of tyranny they have triumphed, and if they are sustained by nations which call themselves free and who ascribe to themselves a mission to emancipate enslaved peoples and raise weak ones then the guilt is with those nations rather than with the minority of men who through usurped military power have succeeded in subverting all the principles which have inspired genuine democrats to make war during the past four tragic years. When the Manchus fell the Chinese who are able to appreciate the great gap dividing the systems obtaining in Chinese from those of progressive nations imagined that tyranny had been expelled, and that their country would be received into the comity of nations on a dignified footing. That the sinister vices of militarism have made this almost impossible to date has been as keen a disappointment to them as it has been to the foreign well-wishers who have hoped for the full realization of responsible government in place of the benighted autocracy which misdirected the whole of the country's affairs.

Almost simultaneously with the termination of the great European war has come the conclusion of civil war in China, or rather hostilities have ceased, and there is every reason to believe that those conscienceless militarists responsible will now pass completely from power and that the ensuing discussion between the rival forces will lead to the permanent inauguration of constitutional parliamentary procedure and government. The President is working to that end, the better elements have fought for it, and certainly if the democratic powers will assist those striving for peace and good government China will be able to declare herself free. Will the powers help her entirely to cast off the evil past or will they for various reasons, having their birth in jealousies, withhold that necessary assistance? Everything the thinking Chinese hope for depends upon the answer to that question. If the Powers are determined to free the world then they must free China. If they burk the question here then they have fought in vain. We are of those who have faith in the reasons animating the nations who threw in their all to make the world safe for democracy, and in that faith we feel that consideration of China's problems will lead to a revision of the relations which have made possible the perpetuation of disciplinary measures which can now well be removed. There ought to be complete revision of treaties and a thorough readjustment of all international conditions under which China has labored. China should be encouraged to feel that she is no longer an international recalcitrant, that she has earned the right to the restoration of her independence, that she is a free nation among free nations. If the trust so imposed is abused then it will be time enough for the League of Nations to discipline her. What she needs now to set her on her feet is the confidence of the Powers, which can be shown to her in no better form than by restoring her independence.

Militarism in the Far East

The prospects of peace in China are more promising now than they have been for a considerable time. The ending of the Great War in Europe while China is yet in the throes of civil strife has either badly shamed the militarists responsible for the continuance of turmoil in this country or it has badly scared them, for they are making ridiculous efforts now to pose as peace advocates and army reformers, and in this capacity are not resisting the efforts of the President to bring order out of chaos by calling for a cessation of hostilities. But this new-born zeal for reform should not be allowed to delude anyone. It has become pronounced only when the great armies of the Allies have beaten down the parent of militarism in this world. The defeat of Germany has been such a significant one that it is bound to have immediate effect on all militaristic organizations: immediate because the victorious armies of the Allies are ready to operate against any other force which is calculated to threaten the future peace of the world. Great Britain, France, Italy and the rest have suffered greatly during the past four years of war and may be tired, but America emerges with all resources tuned, with a great new mercantile fleet and a navy, and a splendid army of some four million men ready and anxious to crush the last vestige of force likely to be misdirected wherever it shows its head. The fate of the European Kaisers and Kings who believed that might could triumph over everything may well be pondered by all those in other parts of the world who entertained similar delusions, and particularly by the militarists of the Far East.

Both in China and Japan there are forces existing which work against security in the future, and if a League of Nations is formed one of the requirements of membership will be a disbandment of armies for which there is no conceivable excuse for existence. Now that the world has had a surfeit of horror; has beaten down the cause of it; has produced conditions enabling a readjustment of states, and governments, and has caused many captains and kings to depart so that the people may shape their own destinies, surely it is not likely that a condition will be allowed to exist in this section of the globe which may at any time develop into another great world-wide calamity. Students of Far Eastern politics competent to express an opinion are apprehensive of strife in China and the Pacific generally because forces are maintained here which are now unnecessary if the aims of the Allies are to be carried out. If the peoples of countries are to determine the form of government under which they desire to live then that principle must be applied to China. Ever since 1911, when the Manchus were compelled to precede the Tzar, the Kaiser, and a few other kings to oblivion, the people of China, as represented by those who desire a constitutional form of Government, have had to fight for very existence because a militaristic coterie with money and men have been able to resist a consummation of their hopes. Unhappily conditions have been such that the militarists supporting the handful of constitutionalists are just as bad as those opposing them; so it becomes imperative, in order to correct the abuses under which the country suffers, to wipe out militarism entirely. If the Chinese people are strong enough to compel such a desideratum so much the better; if they are not then the Allies must exert their influence and compel it. The armies of China have been of no use to any decent cause; they have never been able to earn laurels in defence of their country, and have been ineffective in producing decisive results against their own people ranged either with parties striving for proper government or with bandits. Rather have the armies of China been the greatest curse from which the country has suffered. Disbandment is, therefore, desirable and necessary, and disbandment must be effected.

Cessation of Strife in China Ordered

On November 16 President Hsu Shih-chang issued a long expected mandate ordering the Chinese troops engaged in civil war "to stop fighting instantly and withdraw to their original posts." It has taken the President time and patience to arrive at this result. He has had to contend with a strong military faction desiring the suppression of the South by force, and while there are many who would have been pleased to see him take a strong stand against that faction immediately following his inauguration it is realized that perhaps he has done better by following his own methods. He has by doing so been able personally to persuade the various Military Governors that their aims were wrong and hopeless, and the delay occasioned by their process has brought convincing evidence to his side by the cessation of the European war and the complete so been able personally to persuade the various Military Governors have agreed that war is hell, and are now rapidly wrapping themselves in the garb of peace. In his Mandate the President refers to the victory of the Allies, and frankly remarks that "it is most fortunate and gratifying that despite the opposition on all sides we joined our Allies as a belligerent," and points out that "judging from the victory of one group and the defeat of another in the European war we may see that right must ultimately triumph, and tracing the origin of our internal trouble we at once understand that it is imperative to care for the welfare of the people." This is, of course, a direct allusion to the failure of militarism which it is certain the President is happy enough to emphasise, and the rise to power of Demos; and his assertion that "the administration must be carried out on true republican lines in order to establish a Government by law," gives the quietus to the ambitions of many of the Tuchuns for a restoration of the monarchy and to the insistent rumors that were afloat not long ago that the President himself was working to see the Manchu Emperor once more on the Throne. He subscribes to the doctrine that the "world has been rendered safe for democracy," at all events so far as China is concerned, which hope he further emphasises in the expression that "if my policy can be carried out and the foundations of the State strengthened I may still be able, in spite of my old age, to secure and enjoy peace with the wise men of the day." He advocates the immediate settlement of political differences, the unification of the country—incidentally "to satisfy the wishes of the friendly Allies"—and the importance of developing industries and commerce, etc.

This is the first Mandate commanding definite action which the President has issued since his election some months ago, and it is generally agreed that he has refrained from asserting himself until by personal persuasion he could bring the short-sighted militarists to realize the folly of their campaign. In this respect he has followed the tactics of President Wilson in preparing the American nation for war, and it is to be hoped that the results will be, in comparison, as great and beneficial to China, as has the political tactics of President Wilson to America and the world at large.

Build Roads with Disbanded Chinese Soldiers

Now that President Hsu Shih-chang has ordered a cessation of hostilities the greatest problem which comes up for consideration is: What to do with the soldiers? In Europe a similar problem has to be faced, and while it is difficult there it is doubly difficult in China. In Europe there are industrial pursuits and organized avenues of employment which can be calculated to absorb great numbers, but in China nothing of the sort exists. Most of the soldiers—or rather so-called soldiers—of China have been recruited from the farms or drawn from lawless brigand bands. Merely to disband such men would be to throw them on the country and make conditions worse than ever, the probability being that if such a step were taken the majority, who might previously have been quite honest laborers, would ultimately gravitate to organized bandit gangs or become highway robbers and thieves. There are no private enterprises to absorb them, no Government institutions to employ them. It is necessary then to create employment, and fortunately that is not as difficult as it may seem. With the money that has been or would be expended on their upkeep under arms the Government could put them to the building of roads, transfer them to labor on public works, and in divers ways use their brawn to provide communication with the almost inaccessible places, and provide the people with means to transport produce, which now cannot be moved, to profitable markets.

We have for many years been advocating road building in China on a great scale. There is not a respectable highway in the land, though in recent times efforts have been made to improve communications in a few places due mostly to the purchase by officials of motor cars. The old Imperial roads of China, which in centuries gone by must have been marvellous highways but which to day are deplorable trails, heart breaking to traverse and consequently costly to use for the moving of merchandise or produce, all need attention over their whole length, and there are thousands of miles of them. They radiate from Peking in all directions, penetrating to the uttermost boundaries of the country, and right from the gates of the Capital they are practically impossible as economical avenues of transport. In rainy weather teams are bogged at the gates of Peking, and mules die in the sloughs. Soldiers by the hundred thousand could be set to work on these roads and thereby open up direct motor communication with every district not now connected by rail, and "feeder" connections could be made between every railway and every district capital as well as every producing section of territory. If the whole 600,000 men comprising the useless fighting force of China were thus employed they would have so great a length of highway to improve and make that they would be noticed and would have years of toil ahead of them. But the taxpayer of China, who for centuries have received nothing from the Government, would be immeasurably benefitted, the wealth of the nation would be strikingly enhanced, and the "soldier" would be converted into a useful member of society doing something for the development of his country.

West River Floods

It may be remembered that a letter written by Mr. D. S. Williams, a railway engineer, on the subject of Kwangtung Conservancy Board's West River Report of 1916, was published in our October issue. We have now received a very full reply from the Conservancy Board at Canton, but have no space to continue to produce these lengthy documents, and feel that the benefit of discussing essentially technical questions by letters in the press is well open to doubt. This is especially the case when it pertains to matters on which anybody can, with a few stock phrases, arrive at a resemblance of expertness.

From the convincing and able reply of Captain Olivecrona, the Engineer of the Kwangtung Conservancy Board as published, we see that such proposals as Mr. Williams makes, and as the public would of course always expect, e.g., reservoirs and afforestation, have already had the full and unbiassed consideration of the Authorities, who have come to reasoned conclusions as to their applicability.

In his letter Mr. Williams proposed reservoirs "wherever the actual conditions favor it"; also "afforestation" and "improving of channels." The question of a reservoir system has evidently, from the beginning, had the full attention of the Board's engineers, while afforestation, being a primary and all-important interest of national economy, speaks for itself, and has, we feel sure, the full support of the Conservancy Board, as long as its relation to the flood problem is not overrated. As regards "improving of channels", this has also been given every consideration by the Board.

While so far the means of realization of a big scheme have been lacking we have every reason to respect the efforts of Admiral Tan, a most sincere and progressive Chinese official, who although in no way pressed, has of his own free will asked for and allowed himself to be guided by foreign qualified expert advice, and conducts his work on foreign lines as far as he can. The Conservancy Board in Kwangtung is indeed treading the right path. What is needed is a moderate and just taxation and a strict well-disciplined flood-control system, as proposed. As with all other public works on a large scale, this presupposes a stable and efficient government, or at least a beginning thereof, which perhaps only the League of Nations can give to China.

The Terauchi Ministry and China Loans

The China loans concluded during the past two years of the Terauchi Ministry's administration, aggregate well nigh Yen. 260,000,500 which, compared with Yen 120,000,000 recorded for the days preceding the establishment of the Ministry, indicates more than a double increase, says the *Japan Financial and Economic Monthly*. Of the above gross amount, the Central Government loan occupies Yen 129,660,000, total Government loans Yen 16,250,000, company and individual loans Yen 34,141,500. A total showing particulars of these loans follows :—

Political Loans		Amount (Y.1,000)
2nd Reform	Aug. 1917	10,000
2nd Advance for the above	June 1918	10,000
3rd ,, ,, ,,	July 1918	10,000

Besides the above, there are currency loans and military loans, the former to the amount of Yen 200,000,000, now under course of negotiation and the latter Yen 20,000,000 already concluded in accordance with the Sino-Japanese Convention.

Economic Loans		Amount (Y.1,000)
Hongkong paper mill	Nov. 1916	2,000
Communication Bank	Jan. 1917	5,000
Hongkong Hydro-electric	Jan. 1917	1,000
Canton Industrial	April 1917	1,700
Canton gabelle	May 1917	750
Chihli	July 1917	2,000
Shantung	Aug. 1917	1,500
Yoyuan Spinning	Aug. 1917	1,200
Second Communication	Sept. 1917	20,000
Kirin-Changchun Railway	Oct. 1917	4,000
Nanchang	Nov. 1917	1,500
Chihli Marine (flood?) disaster	Nov. 1917	5,000
Finance Department's Printing	Feb. 1918	2,300
Shihpingkai-Chenchiatung Railway	Mar. 1918	2,000
Hupeh	Mar. 1918	1,000
Telegraph	April 1918	20,000
Mukden	April 1918	3,000
Forestry Enterprise	May 1918	2,000
Kirin-Huining Railway	June 1918	12,000
Shensi Business	June 1918	3,000
Kirin Gold Mine and Forestry	July 1918	10,000
Manchuria and Mongolia Railways	Sept. 1918	20,000
Advance for Tsinan-Shuntienfu and Kaomi-Hsuchow Railway	Sept. 1918	10,000

Antimony Production in Hunan Province

(By Consul Nelson T. Johnson, Changsha.)

While antimony continued to be the most important product of the mines of Hunan in the business of the Province during the year 1917, the production fell off and exports decreased by reason of the return to a more or less normal condition in the price. There was $2,681,190 (U. S. currency) worth of antimony exported from Changsha to the United States during 1916, a large increase in value as compared with $1,500,000 worth in 1915. The quantity exported in 1916 amounted to 4,762 long tons. During 1917, 1,135 long tons, valued at $245,672 (U. S. currency), and 2,157 long tons, valued at Hankow Tls. 454,836, were exported to the United States. The customs statistics for 1917 give the following total exports from the port of Changsha to all countries : Antimony, crude, 42,665,733 pounds, valued at $2,252,807 ; antimony ore, 201,600 pounds, valued at $9,394, and antimony regulus, 29,608,267 pounds, valued at $3,258,712.

Development of the Antimony Industry

The ex-godown prices per long ton of antimony regulus published at Changsha for the year 1917 were as follow, the Hankow tael being the unit of value : January 9, Tls. 215 ; April 16, Tls. 248 ; June 26, Tls. 265 ; September 3, Tls. 190 ; which decreased on December 31 to Tls. 170. [The value of the Hankow tael was about $0.83 at the beginning of January, 1917, and at the beginning of the present year about $1.06]

With the fall in the price of antimony smelters shut down and many of the mines that had been operating as speculations were closed.

The first smelters for the reduction of antimony appear to have been established in 1907, when the Tai Shing Mining Co. was organized for the purpose of producing crude or needle antimony. The success met by this company from the beginning encouraged others, and in 1912, eight smelters were at work and more than 100 mining companies. In 1908 the Wah Chang Mining and Smelting Co. was formed to control the Kuan Tong Antimony Co. of I Yang, which was the first company to discover antimony deposits in China in 1897. The Wah Chang Mining and Smelting Co. introduced the Herrenschmidt process for the production of refined antimony into Hunan. About 52 per cent. of the total importation of antimony into the United States in 1916, according to United States official statistics, was imported from China, and Hunan Province produced about 95 per cent. of the whole production of China. Hunan ores are said to be the purest of the Chinese ores. They are reputed to be practically free from arsenic, carrying from 20 to 64 per cent. of antimony.

The Wah Chang Mining & Smelting Co

Antimony has proven to be pre-eminently a war metal. Little or no demand exists in China. A quantity is consumed in Japan in the manufacture of small ornamental boxes. A very small quantity is used in the Far East in the manufacture of type. The chief demand for antimony is centered in foreign countries and it has grown considerably with the needs created by the war. It was about the month of March, 1916, that the effects of the increased production of the metal began to be felt, and the market declined rapidly until in August, 1916, the price had reached almost the pre-war level. Shipments of antimony from Bolivia and other countries fell off rapidly, and in China, where speculation had been rife, prospective fortunes vanished. So far as Hunan is concerned, it is believed that the only firm that has entered the antimony business, with a view to investment and the development of the properties, is the Wah Chang Mining & Smelting Co. This firm has purchased large quantities of modern machinery and installed a small narrow-gauge railway for conveying ore to the river bank, whence it is shipped to Changsha.

The Wah Chang Mining and Smelting Co. is situated outside the south gate of the city of Changsha on the Siang River. When Mr. Liang Whang-li was studying in England, he learned that the Frenchman, Herrenschmidt, had discovered a process for the smelting of antimony, especially adapted for the extraction of metals of low percentage. So he sent a telegram to the Hunanese gentry asking them to raise funds and secure a mine. They purchased the method and established a smelter. Later they began the production of regulus, requesting the Board of Agriculture and Labor to register the process and to grant them a monopoly of the regulus production. From the first the amount of antimony produced was large, still the price was very low. There were no excess profits, just sufficient to keep the plant running. In 1914, at the outbreak of the war, the price of antimony rose. During 1915 the company earned $3,000,000, and at the close of 1917 additional stock was issued. At the end of 1916 the total capital was Changsha Tls. 3,000,000.

Methods Used in Smelting

In producing antimony regulus the following three methods are used: (1) Ore of low antimony content is smelted to trioxide, again smelted to antimony regulus; (2) crude antimony is roasted in the reverberatory, becoming antimony tetroxide, again smelted to antimony regulus; (3) antimony crude is smelted directly into antimony regulus.

The oxide furnace is the latest method devised by the Frenchman, Herrenschmidt, by which the ore of low metallic percentage is mixed with 20 per cent. fuel and is burned in the furnace. During the burning the antimony contents of the ore become antimony trioxide, which is deposited in the lower chambers of the oxide furnace, and that not so deposited is washed out of the gas in a washing chamber and becomes water oxide. Each oxiding furnace can use 2 tons of ore per day, which, divided by 3, will yield a little more than 1,000 pounds of antimony trioxide. If a lower grade of ore is used, then the furnace will consume in each day 3 tons, which divided by 2, will yield 1,000 pounds, more or less. The ore is put into the furnace twice every hour, each time 80 pounds of ore being put in with 20 pounds of fuel. But the percentage of metallic contents of the ore is not fixed, and sometimes a little more fuel is necessary. The antimony contents of the ore generally will produce 80 per cent. antimony trioxide; the oxide contents of the water will amount to 15 per cent., the sulphur to 3 per cent., and the remainder, left in the ashes and wasted, about 2 per cent.

Reverberatory Furnace Method

The furnace for ore is rectangular, built of red and fire brick. At one end a fire box is prepared and a coal fire built. The furnace is divided up into several compartments. The powdered crude antimony is placed in the compartments, and gradually the sulphur is driven off by roasting, the product being antimony tetroxide. Each furnace will consume 2,400 pounds of crude antimony, which will produce 2,200 pounds of antimony tetroxide.

The furnace for regulus is made of red and fire brick and is rectangular in shape. The centre is made in the shape of a caldron. The furnace is strengthened with iron supports so as to make it very strong and to prevent antimony from running out. The furnace should be made somewhat long, will not need to be repaired very often, but should not be used for more than four months at a time, when a new furnace should be built. The largest furnace can produce 400,000 pounds of regulus. The cost of construction amounts to about Changsha Tls. 600. A smaller furnace can produce 200,000 pounds of regulus, and the cost of its construction is about Changsha Tls. 400. The products from which regulus is produced are antimony trioxide, antimony tetroxide broken up into small pieces, water oxide, ashes or slags, and antimony refuse. With this is mixed soda and charcoal, according to the required measure. All is put into the furnace and subjected to a moderate heat. The first products may be drawn from the furnace after 12 hours. The various combinations are put together in accordance with the following statement:

Substances.	Percentages.
Antimony trioxide	100 parts.
Soda	6 ,,
Charcoal...	24 ,,
Antimony tetroxide	100 parts
Soda	6 ,,
Charcoal...	26 ,,
Water oxide	100 parts.
Soda	6 ,,
Charcoal...	25 ,,

Number and Kinds of Furnaces—Hours of Labor

The smelter is divided into departments A., B., C. and D., containing furnaces in accordance with the following table:

Nature of furnace.	Departments.				Total.
	A	B	C	D	
Herrenschmidt	10	14	—	—	24
Reverberatory	8	1	—	6	15
Regulus	5	4	8	2	19
Combination regulus and reverberatory ...	5	4	8	2	19

All furnace men connected with the Herrenschmidt, reverberatory, and regulus furnaces are divided into two shifts, each shift working 12 hours, from midnight to noon being the first shift, and the second going on at noon and leaving off at midnight. Those connected with the power house, boiler rooms, and engines are divided into shifts and perform their labors in accordance with the same hours as those followed by the furnace laborers.

Machinists in the machine shop work 10 hours each day, beginning at 8 in the morning and ending their work at 6. All laborers work 12 hours each day, commencing at 6 in the morning and ending at 6 in the afternoon. Ore workers are divided into shifts and have the same hours as those in charge of furnaces.

Machinery and Engines

The plant is divided into six sections, viz., boiler rooms, engine rooms, machine shops, foundry, ore-crushing shop, and water supply. The machinery is distributed among these sections in the following manner:

In the boiler rooms are four boilers of the old pattern with a total horsepower of 240. One water-tube boiler of 100 horsepower capacity furnishes power to the electric plant. In addition, five pumps furnish water to the boilers.

In the engine room one horizontal engine of 30 horsepower furnishes power to the ore-crushing department and to the machine shop. One upright steam engine connected with electric-light dynamo furnishes 100 kilowatts, and 2 turbo-generators furnish 200 kilowatts for running the electric pumps at the riverside and for furnishing current for the motors and electric lights. A steam condenser and an upright engine are installed in the plant.

The machine shop contains 12 machines, all for making repairs and constructing machines. They are as follows: 2 planes, 3 lathes, 3 drills, 1 lathe for making borings, 1 threading machine, 1 grinding machine, 1 nail machine, 16 tongs, and foundry. In the foundry two native blast furnaces are used, one electric motor, one earth pulverizer, one modern blast furnace, one blower, two derricks handled by man power, and in addition a pattern shop.

In the ore-crushing shop are 10 ore crushers for crushing crude antimony and fuel. At the riverside three pumps and three electric motors transfer water from the river to the tanks.

The water plant in smelter containing two pumps and two electric motors transfers water from the receiving tanks to the water tower and distributes it to the various Herrenschmidt furnaces. Two ore presses crush ore for use in the Herrenschmidt furnaces. Thirty electric motors inject air into the Herrenschmidt furnaces.

Chemical-Laboratory Equipment

The chemical laboratory is in charge of a chemist and two assistants. They have charge of the examination of regulus ore and crude antimony and the oxides used and produced in the smelter. They also make assays for others who desire to use their services. Their offices are arranged as follows: The chemical laboratory; here quantitative and qualitative analyses are made; at the branch office quantitative analyses only are made; in the weighing room are two scales, one ore scale and one testing scale; in the testing department is a blower, two blast furnaces, and a testing furnace. In the testing department is a man-power ore-crushing machine.

Ore-Extracting Plants—Annual Production

The ore-extracting plants belonging to the company are situated one in the district of Yiyang, known as the Chio T'ong, and three in the district of An Wah—the Chin Yu, Chen Yu, and Kwan T'ong. At Hsing Wah a branch of the Wha Chang Mining & Smelting Co. has been established, and in the Province of Yunnan is the Wah Pao Co.

The following table gives the production of ore, antimony crude, and antimony regulus from 1908 to 1915:

Year.	Ore.	Crude antimony.	Antimony regulus.	Antimony refuse produced outside smelter.	Sulphur refuse	Block Sulphur.
	Tons	Tons	Tons	Piculs	Piculs	Piculs
1908 ...	3,923.65	160.00	—	—	131.15	—
1909 ...	4,021.70	602.20	461.30	—	—	—
1910 ...	3,952.64	1,301.00	962.06	—	131.15	—
1911 ...	3,831.60	1,724.54	2,067.80	—	112.42	—
1912 ...	7,553.38	5,946.80	2,306.60	—	855.54	—
1913 ...	6,887.46	1,387.10	2,658.50	—	37.20	—
1914 ...	6,904.15	356.50	1,888.20	—	12,394.40	—
1915 ...	7,295.50	7,894.60	6,064.20	4,463.84	1,800.10	123.70

Profits and Losses—Transportation Facilities—Extensions

From 1908 to 1914, although the business was good, the price of antimony went down until antimony regulus sold for only Tls. 200 odd per ton. Thus profits were very small. In 1915 the European war broke out, the price of antimony was high, business increased, and the profits of the company amounted to over Changsha Tls. 3,000,000.

The smelter is located on the banks of the Siang River. Large and small steam vessels can come and go. In 1914 a tug and four lighters were purchased from the Yangtse Engineering Works. Thus it is possible to send the products of the smelter direct to Hankow or Shanghai, to bring cargo back from these places, and to transport ore and coal from Yiyang and Siangtan.

Steps are already being taken for the purpose of constructing a regulus plant capable of producing 15 tons of regulus per day. It will have four large reverberatory furnaces, four machines for crushing ore, eight regulus furnaces, and a chimney 160-ft. high. In addition, 10 Herrenschmidt furnaces are to be added for the purpose of producing white oxide, and it is also proposed to add a small railway for the purpose of transporting ore.

Korean Railway Affairs in 1916

The annual report of the Korean railways for the fiscal year ended March 31, 1917, just issued, shows that the traffic mileage at the end of 1916 reached 1066.1 miles, an increase of 428.2 miles when compared with that at the end of the fiscal year 1906. The increase is due to the construction of the Kei-Gen, Konan, and Hei-Nan Lines, and part of the Kankyo Lines, though some change in mileage was occasioned through reconstruction of the existing lines. The following is the mileage for each line: Kei-Fu Line—Main Line, 281.2 miles; Masan Branch, 24.8; Kei-Jin Branch, 18.4. Total 324.4 miles.

Kei-Gi Line—Main Line, 310.9 miles; Kenjiho Branch, 8.2; Hei-Nan Branch, 34.3; Heijo Colliery Branch, 6.7; Shingishu Goods Line, 1.1. Total 361.2 miles.

Konan Line—Main Line, 161.7 miles; Kunsan Branch, 14.3. Total 176.0 miles.

Kei-Gen Line, 138.4 miles.

Kankyo Line—South Division, 33.9 miles; North Division, 32.2. Total 66.1 miles. Grand Total 1,066.1 miles.

Despite the fact that it rained very frequently in the spring of 1916, floods came on in the summer, and pestilence prevailed in the southern provinces in late summer and early autumn, all productive of unfavorable effects upon the traffic, the fine economic condition continued to offset this unfavorable state of things, and the passenger traffic showed 5,288,871 in passengers, and Yen 4,325,502 in receipts.

Goods and parcel offices were established in such centres as Fusan, Taikyu, Keijo, Jinsen, and Heijo, and the handling of consignments of parcels and express goods was started in October, 1916. The great activity in various industries, induced by the great war, and the rich harvest throughout the country, resulted in a great quantity of goods for transport, and the shortage in ships naturally brought the goods to the railway. Thus the traffic in the fiscal year was such as was never before experienced, the tonnage reaching to 1,896,888 tons and the receipts amounting to Yen 4,355,333.

As merchants were feeling the great deficiency in the means of collecting money for goods sold, since they could only issue documentary bills to merchants living in towns where organs for monetary circulation were in existence, or through the post, the system of issuing orders for cash on delivery was started at Nandaimon and thirty-five other stations in and after October, 1916.

Unfortunately, the war in Europe made the service on the Siberian and Chinese Eastern Lines quite uncertain, and the number of through passengers greatly decreased, so the tri-weekly service of the Chosen-Manchuria express was cut down to a weekly one. On the other hand, the Genzan-Bunsen section of the Kankyo Line, which was in course of construction, was opened to traffic in August, 1915; and service by two return mixed trains started, and in September of the same year the time-tables for the Kei-Gen and part of the Konan Line were revised, and connection with other trains made closer. In July, 1916, return service on the Nandaimon-Fukkei section of the Kei-Gen Line was added, and at the same time on every other day service on Shoteiri-Moppo section of the Konan Line, was made a daily one.

The rolling stock at the end of the fiscal year 1916 was 175 locomotives, 360 carriages, and 1,774 wagons.

The results of the hotel business in the fiscal year 1916 were as follow: guests staying at the hotels in Keijo, Kongo-san, Fusan, and Shingishu, numbered 2.842, including 791 Japanese and 2,051 foreigners, making in the aggregate 7,871 stops. The guests for meals reached 24,191, and for dinners, 6,493. The total receipts amounted to Yen 110,473.

Warehousing.—The warehouse business was begun because it was thought it would not only induce increase in the goods for railway transportation but that it would be of great benefit to the economic world in general. For a beginning, warehouses were opened at Keizan and ten other stations in July, 1913. Since the business was started, not only shippers but merchants in general at those places have been much benefited by being able to obtain means of monetary circulation, and the inclination to utilize railway warehouses showed steady increase; so more warehouses were erected in order to meet the requirements at other important places, and at the end of the fiscal year their number reached twenty-three in all. The goods deposited in the fiscal year 1916 reached 52,132 tons, and those taken out, 45,304 tons, while the receipts amounted to Yen 15,276.

Construction Work.—The section extending from Genzan for 35.2 miles to Yeiko is a part of the south division of the Kankyo Line. The construction of this section was taken up in 1914, and traffic on the section was opened in September, 1916, while the remainder of the work is still in progress.

The section extending from Seishin for 58.8 miles to Kwainei is a part of the north division of the Kankyo Line. The construction of this section was taken up in October, 1914, but the greatest floods ever known in the region occurred during the fiscal year 1915, and great obstacles were thereby encountered. Still, the favorable weather after the floods greatly assisted the progress of the work, and the Seishin-Soryo section of 32.2 miles was opened to traffic in November, 1916. The great tunnel through Mozan-rei, the most difficult part on this division, was all but finished, too, during this fiscal year. Part of the division, about five miles between Komosan and Sohyo, is of a temporary nature, to be reconstructed at some future time, in order to hasten the opening of the division to traffic.

Reconstruction of part of the Konan line was taken up gradually, and 89.3 miles of the line was finished by the end of the fiscal year 1916, while the rest is under way.

Light Railways.—At the end of the fiscal year 1916 the lines opened reached 84.4 miles while those not yet opened totalled 134.6 miles. The result of traffic on these lines was very good, reaching Yen 575,990 in total receipts, while the expenditure was Yen 305,765, leaving a profit of Yen 270,225 for the fiscal year. Private lines already in operation reached 32.6 miles, while those not yet worked covered 34.7 miles at the end of the fiscal year.

OPERATING RECEIPTS AND EXPENDITURE.

Item Fiscal Year	1915 Yen	1916 Yen
Receipts:		
Railway Receipts	8,934,307	10,586,430
Traffic Receipts	8,639,917	10,212,182
Passenger	4,331,909	4,830,068
Goods	4,308,008	5,382,114
Miscellaneous	294,390	374,248
Reserve Fund for Losses	—	—
Profit from Stores Account	123	232
Total	8,934,430	10,586,662
Expenditure:		
Working Expenses	7,151,054	7,948,072
Salaries	450,155	410,155
Chokunin Officials	11,579	16,092
Sonin Officials	92,779	74,567
Hannin Officials	344,540	318,995
Grants to Retired Officials	1,257	501
Bonus	—	—
Operating Expenses	5,237,753	5,728,524
General	295,800	218,233
Maintenance	2,317,783	2,433,459
Traffic	2,311,638	2,614,743
Hotel	157,117	160,109
Additional	125,103	270,606
Grants to Relief Association	30,312	31,324
Amounts Refunded, Advanced, or Provided for Loss	1,463,146	1,809,393
Refunded	1,072,485	1,379,589
Advanced	390,361	429,804
Provided for Loss	300	—
Miscellaneous Expenses	4,812	2,558
Grants to Retired Officials	2,217	1,510
Grants to Bereaved Families	2,595	1,048
Total	7,155,866	7,950,630
Balance	1,778,564	2,636,032

Expenses on Construction, Improvement and Extraordinary Works totalled Yen 7,434,505 in 1916.

CAPITAL INVESTED.

	1916 Yen	Total Yen
Valuation of Kei-Fu Railway Co.	—	35,000,863
Sum Defrayed from Military Fund	—	31,383,216
Construction and Improvement	7,434,505	73,977,944
Flood Repairs	—	2,537,212
Extraordinary Repairs	—	1,695,808
Store Fund	—	700,000
Additional Expenses	270,606	1,430,652
Total	7,705,111	146,725,595
Grand Total	146,725,695	—

Net Profit.—The Profit and Loss Account showed a net profit for 1916 of Yen 232.

Japan has turned from an importer of foreign tinned foods to an exporter to the same countries that formerly supplied Japanese requirements. The larger part of the output, however, goes to countries in the South Pacific that ordinarily buy from America and England. Peas, apples, mackerel, salmon and sardines are in great demand. Japanese sardines have even been exported to France, under present abnormal conditions. Tinned crab has been one of the leading articles of food in the export trade for some years, even before the War. However, the prices of tinned goods have risen so rapidly, due to the great expansion of trade and the rising costs of material and labor, that the laid-down cost in America, which is the biggest possible market, is frequently the same as goods turned out by large American manufacturers. Tinned milk is now being produced, but the output at present is only sufficient for Japanese needs.

China's Great Commercial Possibilities

Facts, Figures and Special Articles Concerning Trade Development in the Far East

Once more China's foreign trade has proved itself a hardy and rapid growth able to adapt itself to very unpromising circumstances, for its adversities during the four years of the Great War have been many and severe.

It has withstood internal warfare and political disturbances which threatened for a time the integrity of the nation.

It has resisted for much of the time a high silver market which would have meant its destruction in the years when China's strength was not so great.

Despite the dearth of bottoms and the prohibition of imports and lack of exports in and out of the belligerent countries, China's foreign trade has done more than persist—it has flourished and expanded.

China has once again passed through a crisis and emerged not only intact and in running order, but the better for it.

The Great War has found new customers for her goods, led to direct dealing with old customers who formerly relied upon enemy connections for her produce, and created a demand for her raw products. This has brought her silver with which to buy the foreign manufactures her people need though she would have benefited a thousand fold had she been organized to take advantage of war demands.

Her purchases of foreign goods last year reached the huge total of 595 million gold dollars despite disorganization and civil war. What she might have bought had there been peace in the land, workers in the factories at home to produce, and ships to bear their product to her shores can only be guessed. Every merchant in China knows the huge trade he could have done this year had his godown been filled with goods.

The trade records made last year in the face of adversities only show what is possible, this year and the next, with the resumption of normal trading facilities and the establishment of a stable government. The Chinese have learned how to buy and use new foreign goods which they will need in increasing quantities, and the high value of silver will make their acquisition easy. China has introduced her products to fresh markets, and most of these new customers will still look to her for their supplies.

Considering the days to come, the conclusion is inevitable that something of China's greater future is at hand.

Development will now be resumed with the removal of restraints imposed by the Great War and internal strife. There are factories to be filled with machinery, railways to be built, mines requiring equipment, and depleted stocks to be replenished.

Lines must be laid immediately for the securing of business in the prosperous period that will follow the resumption of normal conditions. Unfortunately for the foreign merchant, trade routes have been diverted, customers have been neglected while his staff has been away on a sterner duty, old connections have been lost, and competitors have arisen. New customers must be found, old customers recovered, new connections must be made among the many manufacturers, merchants and buyers who are seeking business in this undeveloped market of great potentiality.

Because the merchant and buyer are now looking for the information about China and the Far East which they need, and for the reason that the knowledge they must have is scattered through numerous publications and has never before been brought together, the FAR EASTERN REVIEW will publish in January a specially issue known as the "PORTS OF THE ORIENT" Number which will be filled with original and statistical articles describing the sources of supplies, the markets for foreign goods, the transportation and port facilities, and generally the thousand and one features of Oriental trade which can now be learned only through the medium of involved correspondence, the reading of numerous authorities, or a personal visit.

The original matter in the special issue will be of the high order of information which has characterized the special issues of the REVIEW in the past, and kept them in use as text books and authorities for years after their publication.

The description of each port separately in a way which has not been attempted before, in which the commerce is described in detail, with the transportation facilities, the shipping lines, the port arrangements, charges, etcetera, will be valuable to readers abroad as well as to Far Eastern readers who will find the inclusion of all these facts in one volume an aid which is unique.

An important and valuable feature will be a number of informative special articles, each dealing with one of the principal aspects of the import or export trade, by the leading specialist in each line. The source of supply, the route to the intermediate and final markets, and the customs and precedure in the trade will be dealt with in a complete and authoritative manner.

The PORTS OF THE ORIENT issue will, in brief, describe every feature of commerce and activity in China, Japan and the Far East generally in which the business man is concerned, and give all the information required in the first instance by a newcomer in the market, while its carefully edited statistics and descriptions and the special articles on various commodities and trade routes will be interesting to every resident in the Far East as it will be to every reader abroad desirous of securing concrete commercial knowledge of the territory dealt with.

Incidentally its value to the merchant in the Far East in reaching trade connections through its advertising columns will be of a particularly high order.

With the flourishing condition of the cotton spinning industry in Japan by which dividends of 40 to 50 per cent. have become the rule since the beginning of the War, it is interesting to know that the spindles in the mills now operating total 3,115,000. This will be increased by 700,000 when mills now under construction or for which machinery has been ordered are finally in running order. Fourteen mills now under construction and due to begin operation shortly will account for 215,000 spindles of the 700,000 under weigh, while the installation of the greater part is being held up by the difficulty of securing machinery from England and America. Thus Japanese spinning facilities will be sure to increase by 700,000 spindles as soon as manufacturers are able to furnish the machinery of the mills now under construction are completed. This does not take into account the extensions contemplated in existing concerns.

Where the Shanghai Chinese Amuse Themselves

MR. HUANG CH'U-CHIU

The gradual relaxation of the intense conservatism of China is most noticeable in Shanghai. In the October issue of the Far Eastern Review there appeared an account of a Chinese firm of universal providers, the Wing On Company, who are housed in a fine foreign building and conduct their entire business on foreign lines, and now we propose to describe a Chinese place of amusement based on Western ideas and organized with modern methods.

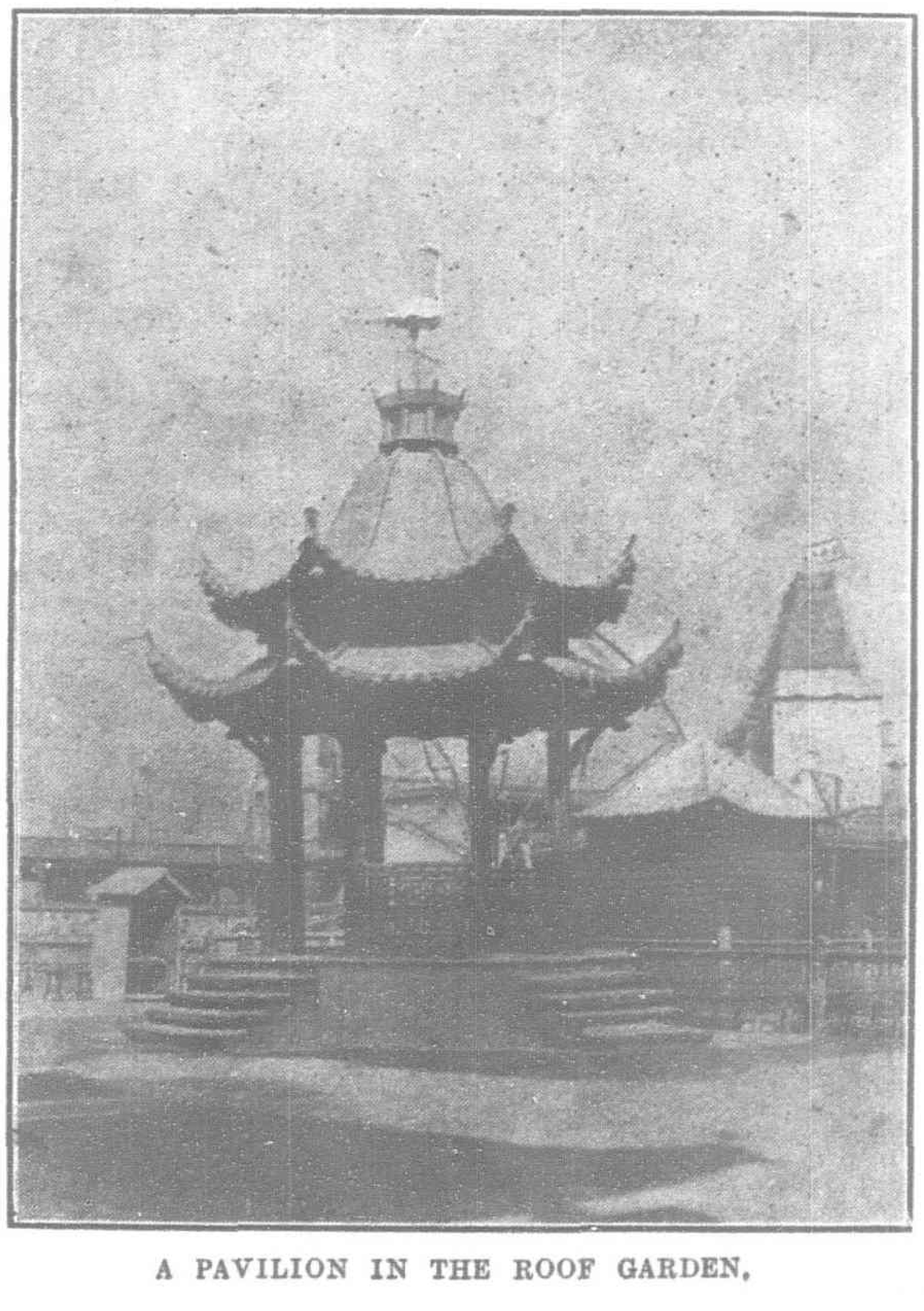
The inception of the scheme is due to Mr. Huang Ch'u-chiu (黃楚九), the first character of whose name is pronounced in the local dialect Wang, who some years ago turned his attention to the amusement business and the possibilities of improvement latent therein. Until he reorganized things, little had been done to alter conditions which already existed when there was no foreign settlement at Shanghai.

His first enterprise was the Lou Wai Lou (樓外樓), (which may be roughly translated 'Building of Buildings') at the junction of the Chekiang and Hupeh Roads. On this excellent site, in the heart of the best Chinese shopping district, he erected a large three storied building. The ground and second floors contained a large Chinese theatre and above was a roof garden and open air cinema. Chinese houses, even of the wealthy classes, are single storied and surrounded by walls. No breeze can reach them and they are made hotter by their construction, which, dating from the days of Yao and Shun, does not admit of through draughts. A roof garden, where the breeze could be enjoyed, and where the Chinese could drink tea in the cool of the evening, was an immediate success. The price of admission was 20 cents, the main profits coming from the sale of refreshments.

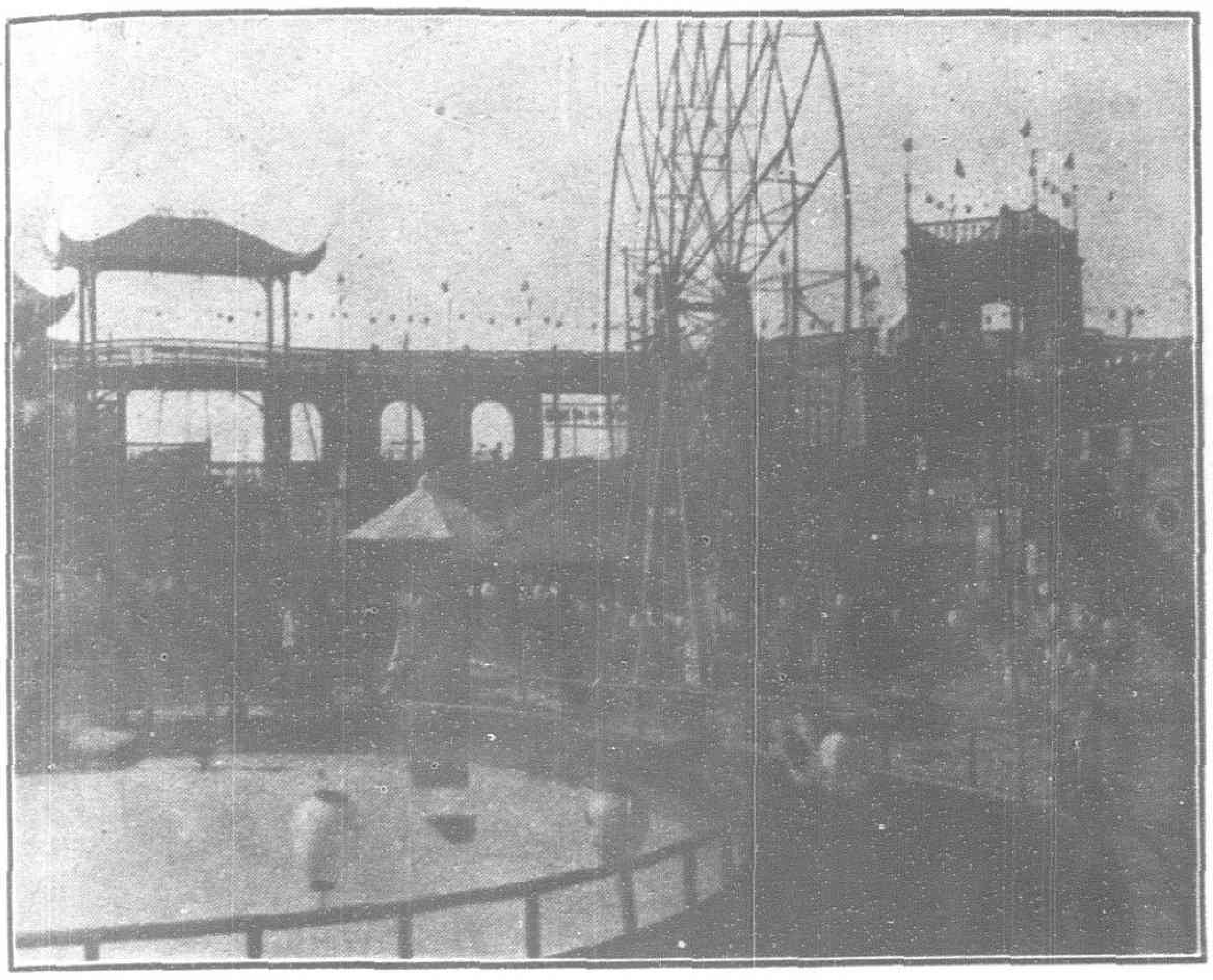
This was the first of Mr. Wang's enterprises. Its success convinced him that the public were ready for a bolder step towards Western methods. He accordingly relinquished his interest in Lou Wai Lou to a syndicate, and in partnership with Mr. Ching Tsung-shan (經宗山), embarked on the construction of an Earl's Court at the eastern end of the race course, where the Tibet Road crosses the Nanking Road. The name of the "New World" was given to the handsome building which occupies the site. This was a great success, but Mr. Huang's partner died: Mr. Wang then surrendered his shares to the widow, who, having considerable experience of the amusement business, wished to retain the direction in her own hands. After a short interval, Mr. Wang, with the advantage of the experience he had gained, decided to re-enter the business and began the construction of the "Great World" (大世界).

The Great World fills a space of fourteen mow, or 2½ acres, at the corner of the Avenue Edouard Sept and the Route Mondidier. The building is of re-inforced concrete and was designed and carried out entirely by the Chinese firm of Chu Shen-tai (朱森泰). Mr. Wong was anxious that the work should be finished in the shortest possible time, and building, which began in March, was finished in time for the opening to take place on the day of the French National Fête in 1917. In addition to the extra fees for night work, etc., Mr. Wong gave a cumshaw of $5,000 to the workmen as a reward for the good will with which they had done their work. The land could not be bought outright, but a lease of twenty-five years was secured. The main building is two-storied, with a two storied tower above, and three roof gardens. The ground floor is arranged in galleries, in which are numerous stalls where all the small objects, souvenirs, knick-knacks, etc., usually sold at exhibitions and fairs, are displayed. The rents paid for these stalls vary with the nature of the article sold: cigarettes and sweets, for example, which command constant sales, pay more than soap, which alas! does not yet sell easily in Shanghai.

There are two large courtyards, in the first of which is an aviary. Here are specimens of various ducks and the familiar Java sparrows, Reeves' and the Golden Pheasant in all their beauty, cranes, ptarmigan, English fowls, peacocks, and unexpectedly, a male and female Cassowary. Outside there are some monkeys and a porcupine. Larger animals are being collected; there is already a large tiger whose coat is in beautiful condition compared to the draggled specimens in European Zoos. The centre of the next and largest courtyard is filled by a small racecourse—a very small racecourse—where very small Szechuan ponies perform. The space in the middle of the racecourse is cemented flat to make a roller skating rink, for the Chinese are suffering from the roller skating mania. A building on one side contains a cinema, to which admission is free. Experience has shown that the Chinese are keenly interested by those films which might be expected to appeal least to them: they are willing to sit through the endless 'parts' in which interminable love stories with a moral are unfolded without understanding anything, but amused and interested by the dress and the scenery. An elderly Chinese remarked to the writer that the decency of the average film came as a disappointment to him, after what he had heard of foreigners' amusements. Many years will elapse before he is able to grasp the plots, and a still longer time before his practical and commonsense point of view is in sympathy with the quixotic atmosphere of cinema morals. But understood or not understood, the cinema is popular, for it is full all the time. In the courtyard there is a Great Wheel, about 80-ft. high, which costs 6 cents a ride, and an aerial railway in which, for a like sum, passengers are transported from one side of the courtyard to the other in small suspended cars. Mr. Wang had originally intended to have every amusement free, but he found that such a course was not practicable.



A PAVILION IN THE ROOF GARDEN.



PART OF THE RACE COURSE AND SKATING RINK.

The machinery would have been worn out long before one half of the willing ones had had their turns. The Chinese love of formal gardening is met by a small garden laid out with the classical stream wandering among the propoer oddly shaped rocks and dwarf pines. Gold fish swim in the stream, and the ground is covered with chryanthemum in bloom. At night small electric glow lamps hang from the trees and are laid in the grass. A large reception room, furnished in the heavy, handsome, Chinese style, where Chinese refreshments are served, occupies the South side. This is very popular with the Chinese gentry, who use it as a tea house and meeting place. Although no one is refused admittance, convention seems to have reserved it for the use of well-to-do guests. Opening from this courtyard, a passage leads to the Board Room. Here the directors meet every day at tiffin to discuss their affairs, and early in the morning the managers of the various departments confer on the events of the previous day, noticing what is more popular and where there is a decline, and trying to trim their sails to the popular breeze. At the foot of a staircase to the second floor there is a theatre where children actors perform. These come principally from Peking, and girls are included among them.

Mr. Wang has a manager who is responsible for the organization of the troupes of reciters, dancers, and actors who are constantly performing. The reciters are placed on the second floor and are always chosen from the best known men of the day. There are always two or three recitations going on in different dialects, so that visitors from distant provinces are sure of hearing something in their own tongue. Sometimes these recitations are given by a single person and sometimes the whole troupe join in, giving them in dialogues. They are very popular and the seats around are always full of visitors. As in the choice of troupes and plays for the two Chinese theatres, every effort is made always to supply the best at the moment so that the patron may hear the latest plays or songs given by the most fashionable actors. On this floor there is a large restaurant run entirely on foreign lines, under foreign supervision, where the tables are covered with table-cloths, foreign knives and forks used to the exclusion of chopsticks, and only foreign food is served. The venture has been unexpectedly successful, and all the seats at the long table are usually filled as well as the small cubicles in which the jeunesse doré disport themselves, not always with their mothers.

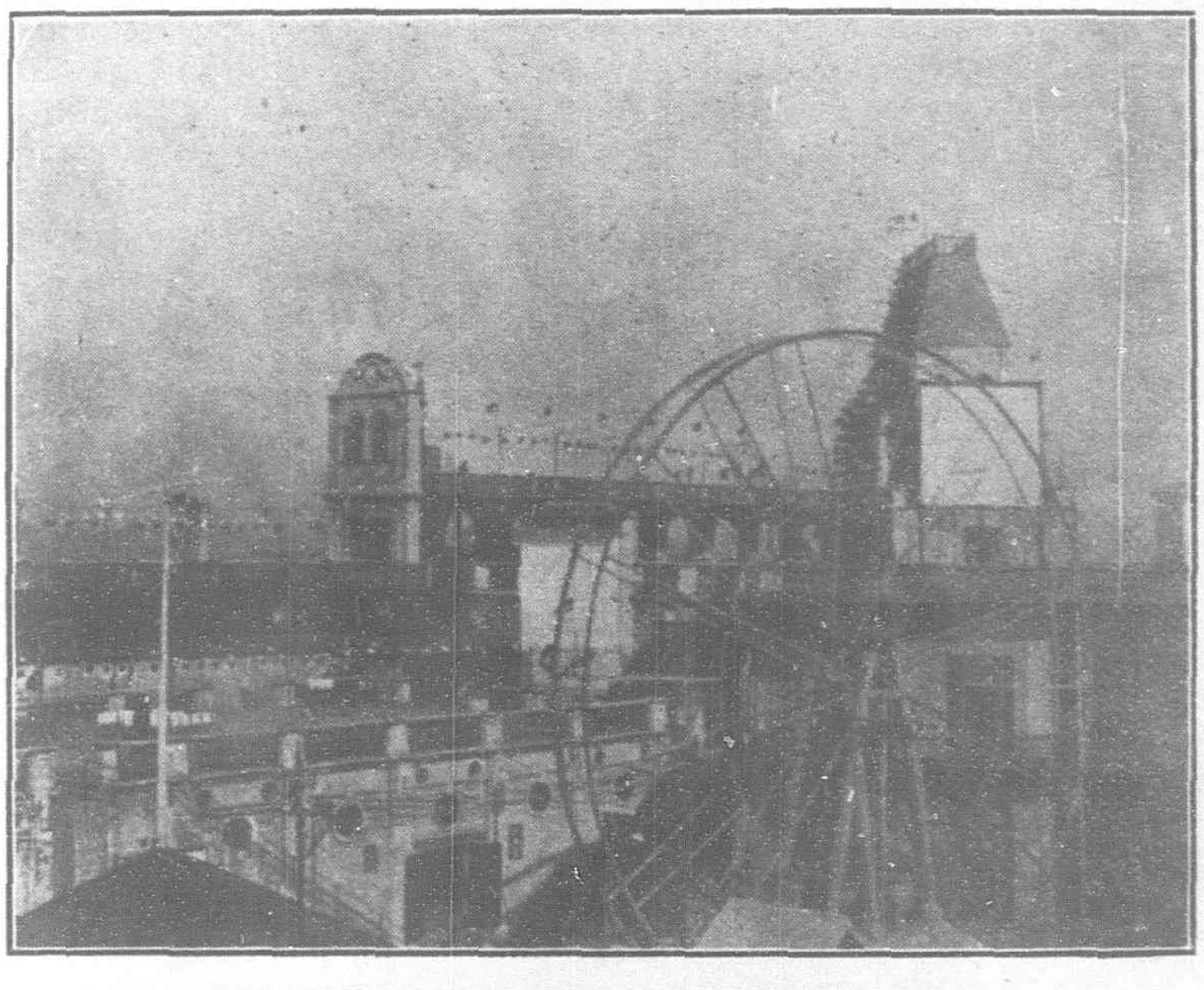
At the head of the main staircase is placed the offices of "The Great World News" (大世界報). This is surely a step in advance of the West! What other fair can boast of a daily newspaper with a circulation of 5,000 copies? And a circulation of 5,000 is a large one in China, where most newspapers represent the views of, and are usually owned by, a small political clique bent on pushing their candidate towards the spoils. The paper is not given away but costs ten cash a copy, and contains, in addition to a summary of the worlds news and a glance at the shifting cross currents of Chinese politics, programmes of what is going on in the theatres and booths and accounts of the plays with gossip about the actors. Many people, no doubt, buy it to find out the result of the lottery. Each ticket of admission is numbered, and every evening at 11 p.m. a lottery is drawn on those numbers. There are 80 prizes, running from the largest, which entitles the holder of the ticket to gifts worth $100 down to the 80th, the winner of which only gets a present worth 50 cents. Mr. Wang knew his public when he started the lottery: a Chinese likes an element of chance in every action of his life, no matter of what nature.

Outside, there are two open air cinemas always going on after dark in summer. The Chinese theatre is the largest in Shanghai, and holds 5,000 people when full, and it usually is full about 10 p.m. This was originally free to all but it was found that some people came early and dug themselves in, not stirring until they had to go home, usually a matter of from five to eight hours. This meant that all the best seats were permanently occupied by the coolies getting their money's worth for the twenty cents they had paid for admission to the grounds. To prevent this, a charge has been made, but in order to make it as light as possible a packet of cigarettes are given away with every ticket. The programme varies, the plays being interspersed with cinemas, to give the actors a rest.

Financially the company has proved a great success. The average number of visitors every day is about 8,000, rising to 10,000 on fine Saturdays and Sundays. The crowds are greatest at the Chinese New Year, when everyone has a holiday: then the figure has reached 40,000 for one day. The company is a limited one, but Mr. Wang and his associates have never allowed any of the shares to come on the market. The capital invested represents well over $500,000 and the running expenses, taking one month with another, are about $1,000 a day.

The educational value of an establishment of this kind is considerable. Foreign innovations, to be genuinely appreciated by the Chinese, must be brought to their notice without their knowing it, and not by someone with an axe to grind. Here the comfort and advantages of cleanliness and order are apparent, and no one, be he as conservative as he may, can come away without having appreciated some of the results of Western civilization. Further, there are few places of amusement for the poorer classes without any taint of immorality, and here they can spend several hours for twenty cents in healthy surroundings. That other houses of the kind are springing up in other large centres in China, including Peking, says much for the popularity of the Shanghai establishment.

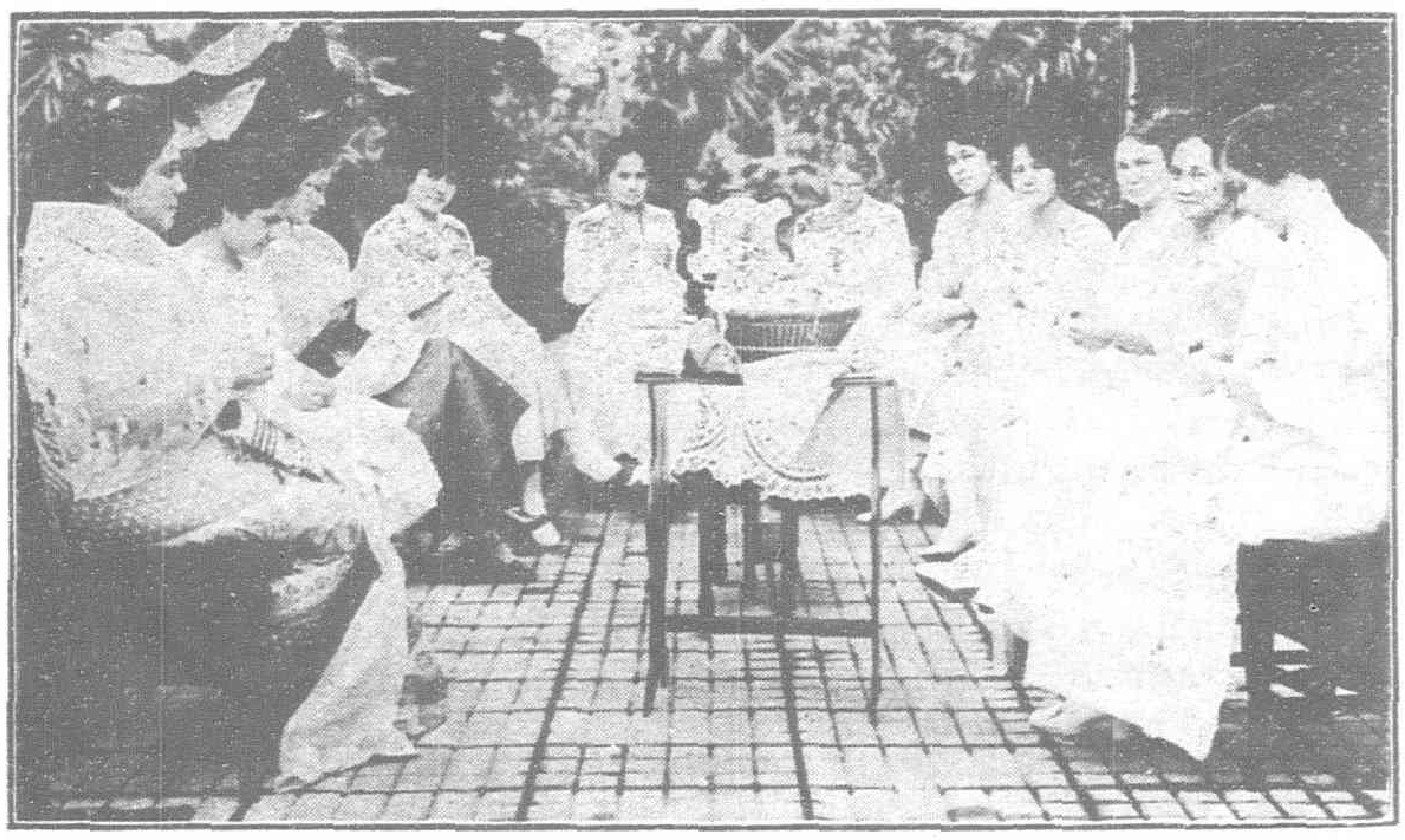
W.



THE GREAT WHEEL AND UPPER ROOF GARDEN,

The Philippines and the War

By Alvin J. Cox, Director of the Bureau of Science



FILIPINO LADIES SEWING CIRCLE

The association of the Philippine Islands with the combat of German aggression and terror has, in a way, been their introduction to international affairs, and on account of our distance from the seat of operations, there has been a great deal of serious thought rather than bursts of enthusiasm. This may be illustrated by an editorial entitled "The Fourth Liberty Loan Drive," in the *Varsity News*, the students' publication of the University of the Philippines (1918), September 6, Manila, from which the following is quoted:

> "The call to the Philippines is unmistakably loud and clear to-day. Her help is needed, and badly too. It is to her interest that the Hun is vanquished. It is for her future that the world should be purged of autocrats. . .
>
> "The university students should lead in an endeavor to help their mother country, the United States, build a "golden bridge" over the Atlantic to Europe and crush Germany with its weight. Imbued with modern and democratic principles, they are the ones most called upon to give an example."

Those who *per se* are opposed to war and the principles and methods of war, are everywhere giving their hearts and souls to this work, for their welfare and well-being are just as much involved as those of the allied countries of Europe. The Filipino people, in their small country, especially have a heart-felt sympathy for those who suffer in Belgium, France, and other allied countries; and 16,000 little school children in the Philippines are making little dresses and other refugee garments, bandages, slings, etc., to help alleviate the misery on the other side of the world.

The Philippine Government fully realizes that it is not large enough to expect to be entrusted with fundamental war duties, but is doing its best, not only in the liberty loan campaigns but also in Red Cross and defence work, increased food production, and last, but not least, in the establishment of the National Guard which is soon to be federalized.

The Red Cross Chapter in the Philippines is one of the greatest forces for good. Full Filipino branches or auxiliaries have been organized to work in co-operation with the American unit and it is not unlikely that all efforts will be directed toward Siberia for the Philippines are near there. The total adult membership of the Red Cross is many times the number of Americans in the Islands and is already about fifteen per cent. of the total inhabitants who voted for provincial governors at the general elections held on June 6, 1916. It will be much more as organization extends. Besides this the Junior Red Cross has about 20,000 members in the public and private schools and dormitories in the Islands.

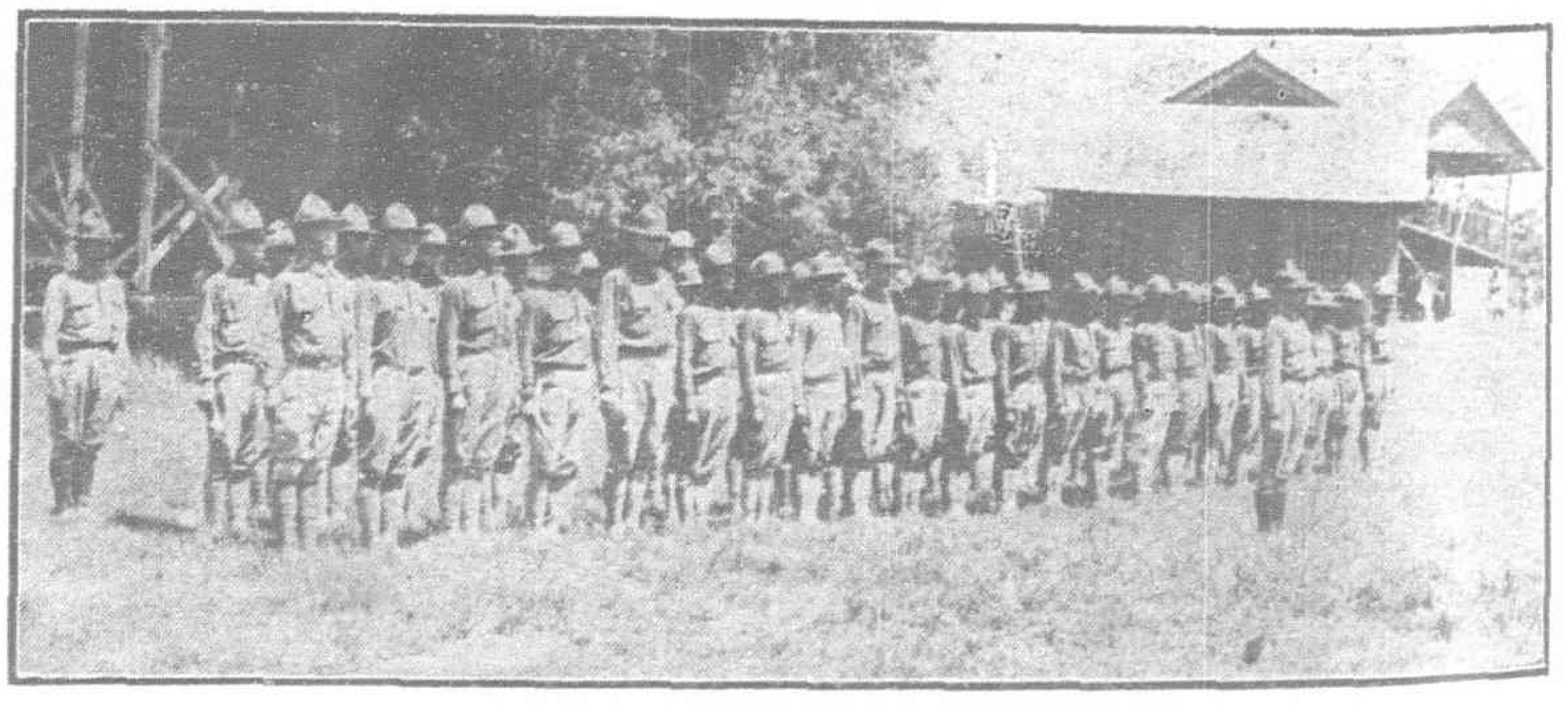
The organization by His Excellency, the Governor-General, on August 17, 1918, of the Council of Defence for the Philippines constituted of Americans and Filipinos working in harmony to co-ordinate the efforts "for the safeguarding of a loyal public opinion and for the organization of our resources for the support of the United States in the prosecution of this war" is of supreme importance. Branch councils have been constituted in each provincial capital with secondary units in the larger towns. This organization has been most useful in dispensing information as to the causes of the war and its progress, the principles being upheld by the Allied Nations, and in systematizing the work of advertising and canvassing for liberty loans, the Red Cross and in suppressing sedition and stamping out undesirable propaganda.

The slogan of those interested in food work may be said to be PRODUCE AS MUCH FOOD AS POSSIBLE AND REDUCE IMPORTS FROM THE UNITED STATES TO A MINIMUM. As an example of this the number of home gardens cultivated by school children during the year has been increased from 50,000 to 100,000 as the result of propaganda.

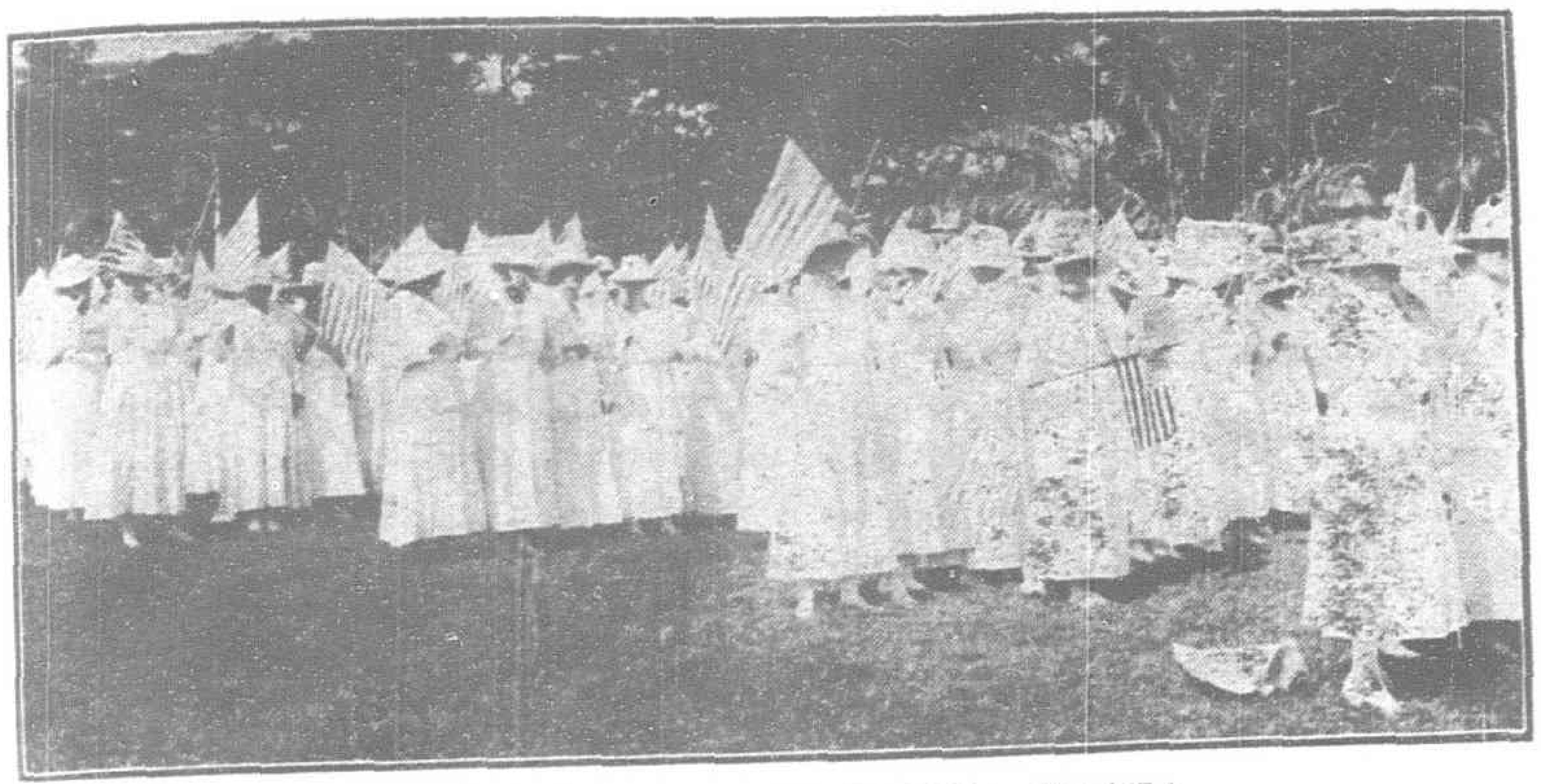
A National Guard officers' training school conducted by regular army officers in accordance with the latest principles governing similar organizations in the United States has been in session since July 5, 1918, and is now about to close. The average attendance has been approximately 1,200 of whom 85 per cent. are Filipinos and 15 per cent. Americans. These students will be called upon to officer the new Philippine Division of 15,000 troops which is to be mustered into the Federal Service on November 1, 1918. The regular army officers in charge of this camp who have served in similar capacity in the United States have been much pleased with the progress that has been made and state that this school compares favorably with any in the States.

The Philippine Legislature has provided P.4,000,000 for the construction of a submarine and a destroyer. The latter was launched in the United States on September 23, 1918, and was christened "José Rizal," the name assigned to her by the Legislature. The allied countries should read into the naming of this ship all the devotion and patriotism of the Filipinos. It is not the sum of money, but the spirit manifested in providing these vessels for use either in the Philippine Islands or outside of the same, and in assigning to the destroyer the name of their great hero and patriot that shows their devotion to the cause of the Allies.

The Philippine Archipelago desires to be as useful as possible to the United States and is prepared to do a great many things if given an opportunity. The Philippine Bureau of Science and other insular organizations are co-operating with the Chemical Warfare Service of the United States Army in an effort to produce in the Archipelago the greatest possible amount of coconut-shell gas-mask charcoal. In 1917 the Bureau of Science published information showing the remarkable absorbative properties of coconut-shell charcoal, which is much more than that of ordinary wood charcoal. The coconut-shells are crudely distilled before shipment to the United States so as to increase the avail-



COMPANY OF STUDENT OFFICERS, PHILIPPINE NATIONAL GUARD DIVISION, MANILA



PATRIOTIC PARADE OF LADIES, MANILA

able charcoal in a given tonnage. There are at present about 100,000 tons of surplus sugar, and large quantities of abaca (Manila hemp), tobacco, etc., awaiting shipment. It is only by accident, as it were, that there has been transportation for coconut oil for which there is the greatest unusual demand. The industrial resources and possibilities of the Philippines are great and everywhere there is a desire to place them at the disposal of the United States and the Allies as fast as they are needed and can be used. An offer of the best of the land in men and material things for the Allies is the attitude of the inhabitants of the Philippine Islands.

Mr. C. R. Crane's Visit to China

The interest which President Wilson evinces in China and her problems, notwithstanding the tremendous issues of the Great War with which he has to deal on behalf of America, is indicated by the recent visit to this country of Mr. Charles R. Crane, who came to the Far East to make special investigations on behalf of the President. Mr. Crane made somewhat of a triumphal tour through the country, being warmly welcomed wherever he went and being given every facility to learn what is to be learned. In Peking he sojourned at the American Legation as the guest of Mr. Paul S. Reinsch, the American Minister, and was entertained by the President and the highest officials, as well as by various Allied Legations. Possessed of an inquiring mind and experience in delving into foreign problems he was quickly able to arrive at the salient aspects of the manifold questions of importance to Chinese and international interests which keep the Capital alive; and in the Provinces through which he travelled he was able to glean the views of the prominent people best able to express opinions on the matters that concerned them. Always he was keenly alert to learn what was possible about the Chinese and their troubles, their desires, their ambitions, and their doubts and fears as to their national future.

At Nanking he was entertained by Tuchun Li Shun, and from various sources was able to ascertain the policy and problems specially engaging the minds of the Yangtsze Tuchuns. Accompanied by Mr. When Shih-chen—the special foreign councillor of Tuchun Li Shun—who is described by the Hangchow correspondent of the China Press as "for years the most popular official of Hangchow," and who deserves the encomium, Mr. Crane travelled to Soochow, Hangchow, and Shanghai. No better guide could have been secured, Mr. Wen being an expert on the political problems of Central and South China in particular, and the whole country in general. Mr. Crane was given most cordial receptions by the Chinese, both at Soochow and Hangchow, and at the latter city he was met by a group representing the leading officials of Chekiang province. He was the guest of the Military Governor Yang Shan-teh and Civil Governor Chi at a dinner attended by all the leading officials of the province. In the evening the heads of thirty government bureaux and boards united in an invitation to him in the Military Club. He was entertained by the Provincial Assembly, a warm address of welcome being tendered him by Speaker Chow, to which he responded in an address which was enthusiastically applauded. In the splendid quarters of the Silk Manufacturers' Guild, the Chamber of Commerce, the Bankers' Association, the Provincial Educational Society, and the Hangchow Young Men's Christian Association were hosts at an elaborate Chinese feast.

At Shanghai Mr. Crane was the guest of Mr. Julean Arnold, the Commercial Attache of the United States, and was met upon arrival by 120 American school children, Chinese officials, a detachment of Chinese regular troops and their band, the American Consul-General Mr. Thomas Sammons, and a number of American residents. On the night of November 26, Mr. Sammons was able to pay a high tribute to Mr. Crane by gathering together the leading international figures in Shanghai at a banquet at the Shanghai Club. As this was the first entertainment accorded the visitor, it was fitting that at this particular period it should have an international aspect, and Mr. Sammons' conception was made impressive as speakers of different nationalities representing various aspects of official and business life in the city welcomed Mr. Crane on behalf of the countries and institutions and Associations represented by them. Each speaker endeavored briefly to inform the visitor of the problems in which they were engaged, and the collective result was highly appreciated by Mr. Crane. The banquet was a great success, a highly pleasing function, and an instructive one.

Nine organizations represented by some 300 people entertained Mr. Crane at tiffin on the 27th, the hosts being the Chinese Company, Shanghai Volunteer Corps; American Returned Students' Club, American University Club of China, Chinese General Chamber of Commerce, Chinese Y.M.C.A., Society for Constructive Endeavor. World's Chinese Students' Federation and the Vocational Educational Association.

On the evening of the 27th Mr. Crane was the guest of the American Chamber of Commerce at a banquet at the Columbia Club, presided over by Mr. Harold Dollar, when he was placed in the position of meeting the leading American officials and business men, and learning their commercial problems, while on the 28th he was the chief speaker at the Thanksgiving service; addressed the Chinese Chamber of Commerce in the afternoon and sailed in the evening for America.

At every gathering Mr. Crane had presented to him some new aspect of Chinese and foreign affairs, and from individual Chinese leaders, representing both the North and South he was able to ascertain their views, and formulate an impartial opinion which should be instrumental in guiding the President to an accurate understanding of the situation in this part of the world. While in Peking Mr. Crane was surrounded with partisans of the militarist group, but in Central China he was able to discuss matters with representatives of the South. Every facility was given Mr. Crane thoroughly to grasp the commercial as well as the political questions affecting both the Chinese and foreigners in China, and it is expected that his visit will result in a definite American policy in China.

Dr. Willoughby and the Constitutional Situation

The Peking Correspondent of the "North China Star" has the following to say concerning the article written by Dr. W. W. Willoughby for the FAR EASTERN REVIEW, on The Constitutional Situation in China, and published in our November issue:

"It is understood that Dr. Willoughby's recent article, pointing out that there are unconstitutional elements in the southern position, has had a very decided effect in the south. The south was well aware of these constitutional irregularities, but it is realizing that their frank statement by so independent and weighty a critic must have great influence with public opinion, and that influence on the whole must be against the south. Dr. Willoughby's article reveals southern constitutional weaknesses, and it also reveals northern constitutional weaknesses; but there has been no claim made by the north that it was the sole repository of a meticulous constitutionalism; indeed, the north has frankly pursued a course that was confessedly a compromise between strict constitutionality and practical expediency."

Standard Locomotives for Chinese Railways

[CHARLES DENBY, SPECIAL ASSISTANT TO DEPARTMENT OF STATE]

One of the urgent needs of China to-day is locomotives. The demands upon the railways have far exceeded the expectations of the builders. The locomotives bought in the first instance have proved too small and it is now clearly realized by the technical advisers of China that they must standardize upon a type that will meet their needs for a long time to come. This question is being earnestly considered at the present time, and the problem arises for American consideration: Will the standardization be along the lines of American design or will it be made to conform to a European model to the detriment of American interests?

Principal Chinese Railways Under European Control

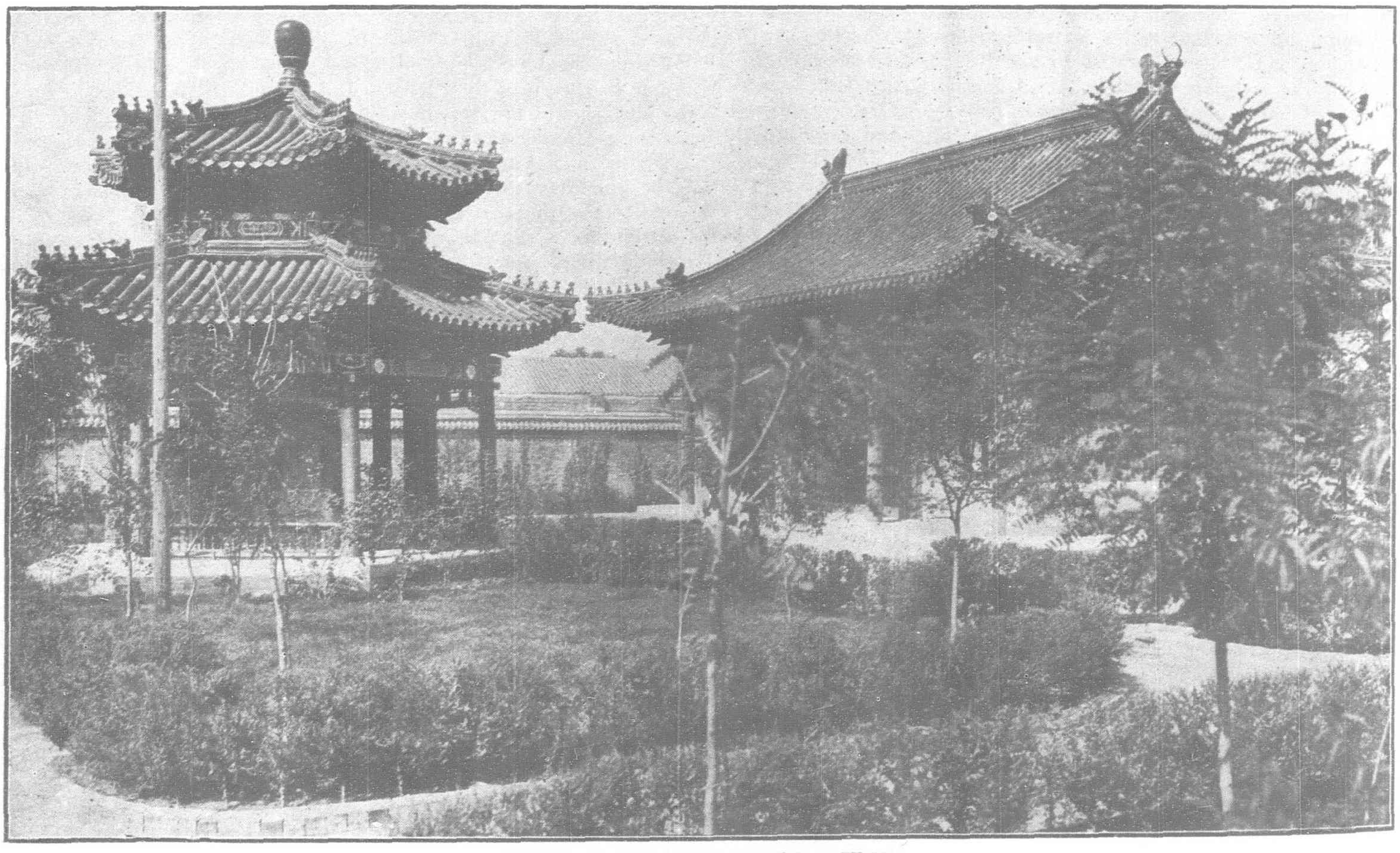
Of the 15 lines composing the system of Chinese Government Railways, only one was built by the Chinese themselves; it is financed by the Chinese Government and is operated exclusively by Chinese. The funds for the construction and equipment of the various other railway lines of China were furnished by foreign capital of various nationalities, but not in a single instance has America so constructed and equipped any of these lines. As a result to-day the Continental (European) design of locomotive is predominant in China. On some of the lines, notably those under English and (hitherto) German influence, not a locomotive other than those built in accordance with the prevailing design common to the nation financing the railway was purchased or even considered, either for initial or subsequent equipment—at least, up to the time of the outbreak of the war. Only in the case of the Chinese financed and operated railway have American builders been given a free hand, with the result that an American design was adopted and a thorough standardization of power effected on this line.

The latest statistics published by the Chinese Government railways (June 30, 1915) show that of a total of 6,600 kilometres (about 4,100 miles), including main and branch lines, industrial tracks, sidings, etc., the three principal truck lines compose approximately 62 per cent. of the total. One of these three lines is under English, one under Belgian and French, and one under combined English and (hitherto) German influence. Out of a total of 638 locomotives in service on all lines at that time only 15½ per cent. were of American design and manufacture; and on the English, Belgian, and French lines mentioned, which operated at that time 365 locomotives, or approximately 60 per cent. of the total, only eight, or approximately 2.2 per cent., were of American design and manufacture.

Few Locomotives Purchased Since War

Since the outbreak of the war but few locomotives have been purchased and placed in service in China, owing principally, perhaps, to a lack of available funds and to internal disorders in the country. As a result of this and of the constantly increasing traffic, the railways are now urgently in need of power. As is often evidenced in the case of new roads, this particular instance of China shows that traffic has increased far beyond the estimates that were made when the initial equipment for power was under consideration, with the result that in addition to the natural depreciation and abandonment of locomotives on account of age, those left in service are light and not of adequate power for the most part to handle the traffic of to-day.

In 1917, 24 additional heavy locomotives were placed in service, and in 1918, up to the time of the present writing, two more have been erected and four are under process of assembly for the Government lines. Orders have been placed or are about consummated for the further addition of 56 locomotives—all for the urgently needed heavier power. Of this number 38 are to be built strictly in accordance with American design and all are



TEMPLE OF THE FOUR PATRIOTS, PEKING

Erection of which was inspired by His Excellency Lou Tseng-tsiang, Minister of Foreign Affairs.

See article on page 492.

from American builders. In addition to this number there are two on order and 21 being considered for private lines, these are to be of American design and standards.

Plan for Standardization of Power and Rolling Stock

The question of the standardization of power and rolling stock is just now being most earnestly considered by the Chinese Government, but a considerable time may elapse before this scheme becomes an assured fact. One American builder has for the past seven years been anticipating the coming of this event, and since the standardization of power on the Peking-Kalgan line every locomotive sold into China by this builder, whether for Government or privately owned railways, has been designed and furnished with this end in view.

Pending the adoption of a standardized power by the Chinese Government the greater the number of modern American design locomotives that can be furnished to the railways here the greater will be the opportunity to obtain the adoption of a strictly American design as the standard of power for China. The benefit of this to American interests is incalculable and should not be lost sight of.—*From U.S. Consular Reports.*

Marine Engines and Motor Boats in the Far East

[CONSUL A. E. CARLETON, HONGKONG, BRITISH CHINA.]

The greater development of the American trade in marine engines of all types in Hongkong and the territory tributary to it is a matter of educational propaganda. The economic value of motor boats must be fully demonstrated to the Chinese and a motor must be produced that is reliable, simple to operate, and not too expensive. High finish is of secondary importance to reliability.

The need of educational propaganda is best evidenced by the experience of a local firm, which some years ago endeavored to interest the fishing-junk people to install motors. A number of these fishermen were much impressed with the idea and went so far as to order a few motors, but at the last moment canceled the order, giving as their reason that it would result in "bad joss" since their fathers had never used motor power on their fishing junks. It is, therefore, this superstition, if it can be called that, which must be overcome before this type of junks can be fitted with motors. But the Chinese are utilitarians above all things, and there is reason to believe that success, or reasonable success, might be obtained if there were introduced on this market a motor that is (1) very cheap in first cost, (2) so simple to operate that a person with no mechanical knowledge can operate it after receiving a little instruction, (3) capable of withstanding abuse, and (4) not dependent upon magneto or batteries for ignition.

Best Commercial Type of Motor

If such a motor can be produced and the manufacturers are willing to send out a skilled mechanic to demonstrate, it is possible that the Chinese fishermen might be, and probably would be, induced to purchase. The same applies in more or less degree to junks in the foreign trade or plying between China coast ports and Hongkong.

For commercial purposes it appears that, in general, crude-oil motors of 35, 50, and 80 horsepower or semi-Diesel engines burning heavy oil or heavy kerosene engines are the types best suited for Hongkong and river traffic. Kerosene motors are thought to be better for commercial work. Under present war conditions crude-oil motors can successfully compete with steam launches, but under normal conditions it is believed by some dealers in Hongkong that the steam launches will retain their position owing to their greater reliability.

Chinese in Canton are making a heavy-duty motor, but it is not thought that this can successfully compete with foreign makes. The Chinese have copied the "Bolinder" type, which they found the simplest of all hot-bulb motors.

Motor Boats at Tientsin

[CONSUL GENERAL P. S. HEINTZLEMAN, TIENTSIN.]

There are only eight commercial motor boats in the Tientsin district at present, three 40-foot and five 25-foot boats. They are mostly used by the native water police and the foreign steamship companies in patrolling the Hai Ho (Peiho) River from Tientsin to its mouth, a distance of 47 miles. There are, as well, a few motor boats here owned and used by foreigners for pleasure purposes only. All these boats have been built to order by different concerns in Tientsin—among them the Eastern Engineering Works and Brossard, Mopin & Cie. The Taku Pilot Co. also builds motor boats of various types.

It is not believed that the motor-boat industry here will witness any market development in the near future, and the termination of the war is not likely to affect it in any way. Such increase in the demand for motor boats as may occur will be very small and will be supplied locally. Rail rather than water transportation in this district is being developed, and the public highways are being gradually extended and improved, whereas on the other hand the streams are being allowed to silt up.

Motor Craft in Amoy Harbor

[VICE CONSUL ANDREW J. BREWER, AMOY.]

In this port all foreigners live on a small island known as Kulangsu, while the business is all done on the island of Amoy, this necessitating some means of crossing the harbor every day. Formerly four and six oared gigs were used for this purpose; but a typhoon last year destroyed these gigs, and most of the business houses and the Marine Customs have replaced them with motor craft, of which there are perhaps 18.

The Amoy motor boat is anomalous, consisting as a rule of a 14 or 18 horsepower engine installed in a native sampan. These boats are found more satisfactory for crossing the harbor in rough weather and for approaching jetties at low tide, when a very shallow draft is required. The engines used are principally of American manufacture, being brought into this port through Hongkong and Shanghai. There are no facilities for the direct importation of American engines

It is difficult to say what conditions here after the war will be. There are one or two motor sampans owned by Chinese at the present time, and if the Chinese develop a decided fondness for motor boats a good market may be established, for there are many Chinese wealthy enough to purchase them. If foreigners continue to be the principal users it is probable that there will be a demand for a few engines every year, but as the foreigners are few in number this demand can never become very great.

Japan's Trade in Boats and Engines

[CONSUL ROBERT FRAZER, JR., KOBE.]

The general demand for internal combustion marine engines, as well as the types of motor boats in use in Japan was fully described in a report from the Kobe consulate published in Commerce Reports on November 1, 1916. Conditions in this line have not changed appreciably since that article was published.

There are very few pleasure motor boats in this consular district, although the Inland Sea, one of the finest stretches of water for pleasure cruising in the world, starts just outside the entrance of Kobe harbor.

At present the demand is for boats and engines for business purposes. Owing to the high price of gasoline (now about 75 cents gold per gallon), engines using that fuel are out of the question for work boats. Practically all of the new engines being installed are hot-bulb motors, burning kerosene, stove distillate, or neutral oil. More and more of these engines are being used every year for fishing vessels and for work boats in the harbors.

The engines are usually built in Japan, although some are imported. In 1913, Japan's imports of gas, petroleum, and hot-air engines amounted in value to $608,125. In 1914 there was a drop to $182,825, and this decline continued into the next year, when imports aggregated only $81,600 in value. In 1916 a slight recovery occurred, imports amounting to $89,950; and in 1917 further progress was made, the total for that year being $131,400.

Before the war—that is, in 1913—48 per cent. of the imported engines came from Great Britain, 30 per cent. from Germany, 8 per cent. from Sweden, 6.5 per cent. from the United States, and 5 per cent. from Switzerland. France and Belgium supplied practically all of the remainder. In 1917, 68 per cent. came from the United States, 18 per cent. from Sweden, 10 per cent. from Great Britain, and 4 per cent. from other countries, which shows that, for the time being, at least, American engines hold the predominant position.

The distribution of the 1917 imports among the leading cities of Japan was: Yokohama, $97,345; Kobe, $9,275, Osaka, $90; Nagasaki, $100; Moji, $10,140; Hakodate, $10,735; other ports, $3,715.

Japanese manufacturers appear to have developed the production of such engines as are demanded by the consumers, so that at present there does not seem to be a large market for foreign engines. Moreover, this market is not likely to improve after the war, unless American producers can lay their engines down in Japan at lower prices than the Japanese manufacturers can produce them. Trans-Pacific freight rates (at present around $25 per ton) and the Japanese import duty must be taken into consideration when computing costs.

There is no demand for ready-built or knockdown boats, as it is much cheaper to build boats in Japan from American plans than it is to ship the parts across the Pacific.

Oleaginous Products of Yunnan Province

A report on the oleaginous products of Yunnan Province, China, prepared by the commercial attaché of the Haifong-Yunnanfu Railway, appeared in a recent number of the Bulletin Economique de l'Indochine. The most widely cultivated of the oilseeds in Yunnan, this report states, is colza. Its production has increased since the war owing to the high price of mineral oil. It is sown in Yunnan from September to November, and the principal harvest is in April and May. The colza oil is of good quality, of golden color, and has very little sediment. It is produced in various districts. The oil yield from districts in the railway zone is from 3,100 to 3,500 tons, representing 10,370 to 11,570 tons of seeds treated by primitive native methods. The average yield in oil cake, after the extraction of the oil, amounts to about 67 per cent. The cakes weigh 4 to 5 catties (catty=1⅓ pounds).

Rapeseed is next to colza in importance. It is harvested in September and October, and yields the same proportion of oil as colza. The total production in the railway zone is 6,000 to 7,000 tons of seeds, yielding 30,000 to 35,000 piculs (picul=133⅓ pounds) of oil.

Sesame is cultivated in almost all districts, though on a small scale, its use in sweetmeats and for food being restricted. Three varieties are cultivated, known as white, yellowish, and black from the color of the seeds. The white gives the best yield and its oil is the most valued. The district of Yuan Meng is one of the chief producing centers; the yield is 300 to 400 piculs. Yunnan could produce large quantities of sesame if a demand arose for it.

Groundnuts, Castor Beans, and Other Oil Seeds

Groundnuts (peanuts) are widely cultivated and are used in sweetmeats and for food. They come on the market from November to February. The total production in the railway zone is 21,000 to 26,000 piculs. The unshelled nuts are sold in "lots" of 950 to 1,000 catties, and each "lot" yields 220 to 230 catties of oil, or about 22 to 25 per cent., though at times the oil yield is not more than 15 per cent. The waste from husks is 25 to 30 per cent. The yield in cakes is 129 to each 1,000 catties of nuts, the cakes being similar in weight to those of colza.

Castor beans grow practically wild. Chinese firms at Yunnanfu estimate that they could supply about 50 tons per annum. Native oil shows a comparatively high degree of acidity, but more careful cultivation might remedy this defect.

Wood oil is produced in various districts. At present it is possible to purchase 100 tons per annum, but this amount could be increased if a demand arose.

Among other oleaginous products of Yunnan may be mentioned cotton seeds and those obtained from a fruit which is a kind of persimmon. Cotton seeds are rarely employed for the manufacture of oil, but are used principally to feed animals. These seeds come on the market in considerable quantities. The oil extracted from the persimmon-like seed referred to is used locally; the quantity produced is probably important, but no estimate is possible.

Construction Work in Burma

[CONSUL LAWRENCE P. BRIGGS, RANGOON, BURMA, INDIA.]

The report of the public works department of Burma for the year ended March 31, 1917, shows that during the year the total expenditure of the buildings and road branch of the service was $4,073,561, as compared with $4,576,652 for the official year 1915-16 and $5,087,130 for the official year 1914-15. This does not include the amount spent on navigation canals, irrigation works, and protective embankments, which are covered by another report of the public works department.

Under the head of "civil buildings," the principal events in building construction were the completion of a new customs house and a new telegraph office in Rangoon. The cost of the former was $204,595, and that of the latter $199,704. From an architectural standpoint these two buildings are among the finest in Rangoon.

Other important buildings completed during the year were combined post and telegraph offices at Akyab, Prome, Insein, and Maubin, and a 30-kilowatt wireless station at Maymyo. Very little building was begun during the year and few works could be finished because of the difficulty of getting plumbing and other supplies.

The chief amounts expended for original works and repairs on the various types of civil buildings were:

Items.	1914-15	1915-16	1916-17
Police	$277,447	$214,903	$154,200
Administration	130,089	87,113	148,447
Medical	248,069	160,750	128,095
Jails	133,861	81,597	70,269
Telegraphs	107,993	89,654	56,510
Educational	149,365	78,572	43,465
Law and justice	61,439	40,937	27,109
Post offices	17,574	31,366	24,441
Customs	81,320	71,746	23,046
Forests	17,850	20,326	15,224
Ecclesiastical	25,406	8,378	6,216
Others	158,693	78,932	69,503
Total	1,409,106	964,274	766,525

The amount of money expended for "Miscellaneous public improvements" during the years 1914—1917 was as follows:

Items.	1914-15	1915-16	1916-17
Improvement to towns	$81,270	$107,650	$84,005
Markets	118,650	140,626	109,290
Paving and streets	109,187	140,317	136,975
Water supply	78,389	155,144	141,039
Sewage and drainage	45,655	59,032	73,301
Lighting	44	628	47
Harbors	44,662	49,522	42,168
Lighthouses	35,523	39,017	34,801
Miscellaneous	23,853	24,096	26,579
Total	537,233	716,032	648,205

The principal town improvement carried out during 1916-17 was the reclamation of towns in the delta district. Markets, or bazaars, which form such an important part in Oriental life, were constructed in several towns and improved in others. Drainage schemes were carried on in some small cities, but no large works were undertaken during the year. As a matter of fact, while the Burmans are among the cleanest of Orientals, drainage and sewerage are not so far advanced in Burma as in many other European possessions in the East. The harbor improvements carried on by the public works department in 1916-17 were in connection with small delta and coastal towns and did not concern any of the principal ports of Burma. The improvements in the China Bakir lighthouse, near the mouth of the Rangoon River, were completed.

Quality and abundance of water supply are important questions in all Oriental towns and in this respect Burma has done better than it has in other municipal matters, such as sanitation, lights, and street railways. The problem in the delta region is to bring in fresh water from a distance or to purify surface or river water which exists everywhere in abundance; while in the dry region of Upper Burma, wells are sometimes drilled to a depth of 700 feet or more without finding a suitable supply. In the delta and coastal regions, 11 towns have artificial waterworks;

in the dry region, 6 towns are supplied with wells, while in the hill regions of Upper Burma, 5 towns are supplied with water brought by pipes from streams or natural springs by hydraulic pressure or by gravitation.

The construction and repair of the roads of Burma is generally under the control of the building and roads branch of the department of public works, although in some parts, notably Upper Burma and the lower Tenasserim coast, a good share of the unmetalled road is maintained by the local authorities. The total expenditure for communication during the year ended March 31, 1917, was $1,661,595. Of this amount $642,493 was spent for original works and $1,019,102 for repairs. This is $48,468 less for original works and $66,062 less for repairs than was spent during the official year 1915-16 and $211,136 less for original works and $187,098 for repairs than was spent during 1914-15.

Roads are classified by the public works department as metalled, unmetalled, and others. The so-called "metalled" roads are built up of laterite and usually ballasted with sandstone and are available for automobile traffic throughout the year. "Unmetalled" roads are unballasted though sometimes built up of laterite and are often passable for automobiles during the dry season.

During the year 1916-17, 1,912 miles of "metalled" roads were maintained by the public works department and 4 miles by the local authorities, as against 1,932 miles maintained by the public works department and 5½ miles by the local authorities during the official year 1915-16, and 2,000 and 8⅓ miles, respectively, during 1914-15. Of the "unmetalled" roads, 8,706 miles were maintained by the public works department and 1,726 miles by the local authorities.

Motor Omnibus Service for Tokyo

The recently incorporated "Tokyo Shigai Jidosha Kaisha," will place motor omnibuses and carrier lorries on the streets of Tokyo with the New Year. The service will begin with 180 motor omnibuses, 200 motor lorries and 100 motor cars for hire. In addition the company's business will embrace the manufacture and sale of motor cars and transportation in all its branches. Omnibus routes will largely follow the present tramway tracks. The fare is a flat charge of 10 sen for each route, and no transfers will be issued. The buses will travel at a rate not exceeding 10 miles an hour, will carry 16 passengers, and will operate on a headway varying from 2 to 5 minutes. The motor lorry service will collect and deliver goods at a flat sum per mile. Motor cars will be provided at a charge of Yen 5 per hour, with an additional 10 per cent. for work at night, inclement weather, or suburban travel. The company is capitalized at Yen 10,000,000, of which Yen 5,000,000 has been paid up. The net annual profit has been put, with the precision and thoroughness which new enterprises in Japan seem to strive for in their prospectuses, at Yen 1,033,047.60. As the company operates under a Government subsidy of Yen 1,000 per year per car and thus may have its vehicles commandeered for national purposes, by the same Imperial Ordinance the shares will be available only to Japanese subjects.

The Terauchi Ministry's Outlay on Rice Adjustment

Altogether Yen 23,000,000 has been spent by the Terauchi Ministry in trying to adjust the price of rice after the rice riots. When the Government announced its plan to requisition rice it was the intention of the Government to purchase 250,000 *koku* of Japan rice for Tokyo district and 250,000 for Osaka district (including Kyoto, Kobe and Osaka), totalling 500,000 *koku*. But whereas 250,000 *koku* for Osaka district was actually purchased, the amount for Tokyo district was reduced, so that the total purchase of Japan rice by the Government was 400,000 *koku*. The requisition law was not actually enforced, the Government buying at higher figures than the price originally set. When the Government set the official price at Yen 31, to 33 per *koku*, it purchased at from Yen 35 to 40, averaging Yen 37. In selling, the Government disposed of the rice at from Yen 30 to Yen 31, so that the Government had to pay to the rice dealers, who were officially selected to deal, an average of Yen 6 or 7 per *koku*, including commission and other payments. It was estimated, therefore, that for 400,000 *koku* of rice purchased by the Government, about Yen 3,000,000, or thereabouts, in round figures, will have been spent by the Government in supplying the market with Japan rice alone.

With 500,000 *koku* of foreign rice which was scheduled to be imported during October, the estimated importation by the Government for the present plan will stop. The total importation then will amount to 3,300,000. It is understood that an average of Yen 6 per *koku* will have to be paid over to the Government-appointed rice dealers to fill the gap in the price, so that the total amount to be paid will be in round figures Yen 20,000,000.

Adding the two items together, the Government will have paid Yen 23,000,000 out of the national treasury for both home and imported rice as the expenses of the plan for adjustment of price of rice.

The Government, on October 2, announced that the purchase of rice by the Government would be stopped from that day, because it was decided that it would be better to allow the price of rice to adjust itself naturally, especially now that new rice, of which the crop prospect is good, will be on the market shortly.

South China Fuel Situation

The coal shortage in Hongkong and Canton, which characterized the fuel situation in South China during 1917 and to some extent since the war began, still affects industry and transportation in all this part of Asia, although both industry and transportation have adjusted themselves to the situation and there is less complaint than there was last year, writes U.S. Consul-General George E. Anderson, of Hongkong. Nevertheless the price of coal has still further advanced, particularly when the advance in exchange is considered, and Japanese soft coal that was sold a year ago at $20 local currency per ton now sells for $33 local currency.

Imports of coal into Hongkong for Canton and local use and for bunkering were a little larger in 1917 than they were in either 1916 or 1915. The imports in detail for the past four years have been as follow:

Imported from—	1914 Tons.	1915 Tons.	1916 Tons	1917 Tons.
Japan	1,007,984	731,336	764,926	709,216
Formosa	—	2,550	15,889	125,376
North China...	255,875	167,280	137,478	165,466
Manchuria	85,890	63.742	73,975	52,345
Tonkin...	149,739	81,581	80,746	118,103
Borneo	17,827	—	—	—
Australia	2,900	6,380	—	—
Cardiff...	92,896	—	16,852	4,450
Total...	1,613,111	1,052,869	1,089,866	1,174,956

The most significant feature of the record is the increased use of Taiwan (Formosan) coal, the comparatively short freight haul, and the increasing price of coal in Japan stimulating its use. The distribution of the trade naturally has been due very largely to the varying course of shipping. At times the demand for fuel in Hongkong and dependent ports has been almost altogether a matter of shipping, for it was badly needed at almost any price. The continued high cost of fuel is changing the course of transportation all over south Asia, while its influence upon some industries has been very serious.

The price of the pig-iron supplied by the Hanyehping to Japanese Government Ironworks has hitherto been at the rate of Yen 42 per ton. It has recently been raised to Yen 120 in compliance with the request of the Hanyehping authorities. This pleases the *Jiji*, for it will be of some use in smoothing away difficulties lying between the two peoples. Surveying the relations between the Hanyehping and the Wakamatsu Ironworks, the paper says that they are of two decades' standing. But the present relations date from 1913 when Yen 15 million were loaned by the Yokohama Specie Bank to the Hanyehping Works. And this loan was to be paid in 40 years in pig-iron or pig-iron ore, the former being estimated at Yen 26 per ton and the latter, Yen 3 per ton. This arrangement worked four years. Since the outbreak of the European war, iron has remarkably appreciated, while it is to be assumed that the cost of production for the Hanyehping has also increased in consequence of the general rise in prices. Such being the case, there is no denying that the continuance of the arrangement of 1913 would be disadvantageous to the Hanyehping, though it would give enormous profits to the Wakamatsu Ironworks. Accordingly, the price of pig-iron to be supplied was raised to Yen 40.50 per ton in 1917. Later, however, the Hanyehping authorities requested a further increase in price, and the negotiations have been pending since the late Cabinet. Of course, this decided increase in the price of pig-iron will prove a serious burden to our Government Ironworks, but the journal hails it as a measure to cement the friendly relations between Japan and China, especially in view of the complaint heard among the Chinese that we are exploiting China without paying consideration to their interests although we profess to befriend them.—*Herald of Asia.*

ENGINEERING, FINANCIAL, AND INDUSTRIAL NEWS

RAILWAYS

Siamese Railway Fares.—The Siamese State Railway Department increased the rate on passenger traffic for all the lines of the State railways by 20 per cent. as from July 1. This step had to be taken owing to the rise in price of railway materials received from Europe and America, and the heavy maintenance expenses incurred in repairing the damage caused by last year's floods.

Siam Short of Rolling Stock.—On the Siamese Northern Line there is a usual daily shortage of about 200 wagons, and sometimes as much as 400 wagons are short, while on the Northern Line the shortage reaches about 100 wagons per day. This condition is owing to the fact that new goods wagons cannot be built there because of lack of iron framework, wheels, steel tires, and other iron and steel fittings, which are not manufactured in Siam.

Siamese to Study American Railways.—Eight Siamese students connected with the Royal Siam State Railways are to study in the United States American railway methods. This is a new departure inaugurated by the recently appointed commissioner general of the Siamese State Railways. These students will be under the care of the Siamese Legation in Washington.

Kirin-Changchun Line.—Work is in progress on the tunnel through Tumenling Pass on the Kirin-Changchun Line which was to have been started last spring, but which was held up by the interference of rains in brickmaking. A supply of bricks is now ready, and preparations for tunnelling work have been taken in hand.

Japanese Railway Returns.—The freight transported on Japanese railways during the first half of the current year aggregated 28,248,706 tons or 154,365 tons per day, the proceeds therefrom being Y.51,137,659 or Y.279,441 per day on an average. This is an increase of 2,839,000 tons or of 13,851 tons per day, and of Y.8,705,000 in the total proceeds as compared with the returns recorded for the preceding corresponding period.

MINING

Lead in Heilungkiang.—A wealthy Chinese is planning to establish a company at Harbin with a capital of $200,000 to explore deposits in Heilungkiang Province. He recently discovered lead deposits in Mulan Prefecture and has applied to the Department of Agriculture and Commerce, Peking, for the necessary concession.

New Source of Graphite.—A Chinese ore dealer is reported to have discovered a graphite deposite of superior quality at Chintsailkou, in Kuantien Prefecture, Fengtien Province.

Wolfram Ore in South China.—A syndicate has applied for the privilege of developing the wolfram deposit at Pak Shak Lum Hill, in Heungshan district, Kwangtung Province, by offering $30,000 in advance as a tax, and also promises to lend $100,000 to the Government within ten days after the permission is granted.

Japanese Colliery Combination.—The Yamashita Kisen Kaisha is reported to be arranging the establishment of a mining company with a capital of Yen 10,000,000 by combining the interests of the Yamashita Coal Company, the Hombetsu Colliery (Hokkaido), and the Yamashita Gomei Kaisha. The last named holds extensive mining concessions at Otani, Miyao and Tsuhara, Kyushu.

Sale of Siberian Mines.—A Japanese correspondent at Chita reports that the Provisional Siberian Government announces the sale by auction at Irkutsk of two hundred and eight mines on February 25, 1919. The number of the mines which foreigners are entitled to buy is limited to thirty-eight, but those who have the special permission of the authorities can bid for others. The measure is resorted to by the Siberian Government with a view to supplementing its finances.

Suan Mines.—The mills on the Suan Concession, Korea, during the month of October, treated a total of 16,700 tons of ore resulting in a gross recovery of Yen 258,000.00. Ore developments in the Tulmichung and Tong Ahm mines continue to be highly satisfactory.

SHIPPING

Standard Shipbuilding at Hongkong.—The British Government has contracted with the Hongkong and Whampoa Dock Co. (Ltd.), Hongkong, for the construction of six standard steel ships. The dimensions of the first boat are 325 by 45 by 26-ft., with a carrying capacity of 5,000 tons. The vessel has been constructed from American manufactured steel materials. Five other standard ships are in hand in the dockyard, each of 8,000 tons carrying capacity; their dimensions are 400 by 52 by 31-ft. Four of these vessels will be built of American steel materials and the fifth one of British steel.

Japanese Shipyard enters Shipping Trade.—The Kawasaki Dockyard Co., Kobe, is embarking upon the shipping business on its own account. According to its plan, 30 cargo-boats of 6,000 ton d.w. class will be built in the next fiscal year for exclusive use of the Company, to equal the tonnage of the Toyo Kisen Kaisha. Three steamers have already been assigned to service in the South Seas. Thus the first regular exclusivee cargo service in Japan will be inaugurated and maintained by the Company. The Company established recently a Mercantile Marine School and is equipped with every necessary factor for the maintenance of a marine transportation system.

Chinese Steamship Line.—A new steamship corporation, owned and controlled by Chinese capitalists, was inaugurated in Shanghai, on September 4, to transport salt from Haichow to Chinkiang. The company will operate three chartered Japanese steamers.

Reconstructed River Steamers for Coast Trade.—The San Peh Steamship Co. have purchased and reconstructed for service on the coast the two French steamers formerly in the Canton River Service, the *Paul Beau* and *Charles Hardouin.*

Shanghai-Japan Freight Rates. — Freights between Japan and Shanghai recently rose by about 30 per cent., the rate on ordinary merchandise from Japan to Shanghai being raised from Y.7 to Y9.50, while the new rate for ordinary merchandise from Shanghai to Japan ports is $9.50 Mex. The Nippon Yusen Kaisha has decided to grant a rebate of 5 per cent. on its Shanghai line to shippers who ship only by the N.Y.K. vessels. The rebate is to be calculated on the total freights paid in a year, and will be paid six months after the closing of accounts.

Chinese Line for Trans-Pacific Trade.—Chinese papers report that a new steamship company known as the Chinese Pacific Steam Navigation Company is about to be formed at Shanghai by Chinese merchants abroad which will lease ships from the China Merchants' Steam Navigation Company to carry passengers and cargo in the trans-Pacific trade. At the last meeting of the directors of the China Merchants' S.N. Co., it is understood, it was decided to charter six of the Company's fleet to the new concern. The names of the six vessels are the *Hsinkong*, *Hsinchang*, *Kwanglee Kungping*, *Irene* and *Chiyuen*, the charter price of which is to be fixed at $105,000 per month. It is said that both parties have agreed to the terms and an agreement will be concluded shortly.

A Shanghai Launching.—The New Engineering Works of Shanghai launched the s.s. *Hydra* on November 6. for a Norwegian firm. The vessel is 245-ft. in length over all, by 37-ft. beam, and is 17-ft. in depth, with deadweight capacity of 2,050 tons. The *Hydra* will be equipped with triple-expansion machinery of 1,000 h.p. supplied by two cylindrical boilers. The enginers, boilers and auxiliary machinery have been constructed by the builder. Another vessel, the s.s. *Hero*, built by the same firm, had its speed trial on November 4, and easily attained a mean speed of 11.56 knots. The *Hero* is 254-ft. in length over all, 37-ft. in breadth, and 17-ft. in depth, with deadweight capacity of 2,050 tons. The greater part of the machinery was constructed by the builder.

Chinese Yard Launches 4,500-ton Steamer.—The s.s. *Mylie*, launched by the Nicholas Tsu Shipbuilding Works at Shanghai, on October 22nd, is the first of two ships in hand by the builder for the Haichow Steamship Co. Originally designed for carrying salt from Haichow, the *Mylie* was altered for the Saigon-Rangoon trade and is of the spar-deck type with accommodation for 35 first class, 50 second class, and 400 deck passengers. Her dimensions are 262-ft. by 40-ft. by 25-ft. 3-in., with a loaded displacement of 4,500 tons. She will be driven by triple-expansion machinery of 1,300 horse-power supplied with steam from two water-tube boilers, at an estimated speed of ten knots. The machinery and winches, including two steam capstans, have been constructed by the builders. The designing of the vessel, the building of the engines and the general supervision were all carried out by Europeans.

The Hsin Pingan launched at Shanghai.—The Toong Yuen Shipbuilding Works of Shanghai, launched on October 25 the 2,000 tons d.w. steamer *Hsin Pingan*, with dimensions of 250-ft. by 34-ft. by 20-ft. The vessel will be fitted with a single set of triple-expansion engines designed for ten knots. The yard had previously constructed two other steam vessels, one of 650 and the other of 580 tons.

Japanese build 9,000-ton Ship in 23 days.—The Kawasaki Dockyard at Kobe recently broke the world's shipbuilding record by launching a 9,000-ton steamer in 23 days. Special attention was paid to its construction with the purpose of improving upon the previous record, that of the Camden Yards of Camden, New Jersey, in building a 5,548-ton steamer in 27 days and three hours. It is believed that the vessel will be entirely fitted out within 50 days of the laying of the keel. The ship is one of several stock vessels built with the material obtained from the United States in return for the delivery by Japan to that country of a number of steamships.

Salvage of Chinese Warships.—A Japanese salvage company which secured the privilege of salving material of Chinese warships sunk in Weihaiwei Bay has succeeded in salving a large amount of steel from the wrecks. The material thus acquired is lashed to the bottoms of large junks and sent in this manner to Port Arthur. The company is said to have already cleared about £200,000 from the venture. The contract expires December 31st, when it is expected the British Admiralty will call for fresh tenders.

Old Marine Boilers Prove Valuable.—The Japanese salvage company engaged in working on the wreck of the s.s. *Asia*, which was lost five years ago, has brought two of the ship's boilers to Shanghai where one of them has been sold to Chinese buyers for $64,000. The same company has also recovered four of the boilers of the s s. *Poltava*, which was lost only last year, and the four boilers have been landed in Shanghai. As the boilers of the *Poltava* are only about six years old, as compared with the 23 years of the *Asia's* boilers, the former will undoubtedly be more valuable.

Attempted Salvage of the Shaoshing.—The Marine Department of the Chinese Maritime Customs is now engaged in the recovery of the boilers of the s.s. *Shaoshing*, which was lost in the Yangtze Estuary, but owing to the rapidity of the silting it is considered doubtful if the effort will be successful.

Cargo Steamers of Japan.—According to latest official figures the cargo steamers of Japan total 256, with a gross tonnage of 687,343 tons, besides 56 ships with 167,334 tons either under repair or missing.

The following are the particulars :—

ADJACENT SEAS.

Shipping Route	Vessels	Tonnage
Coast	46	85,189
South China	36	61,494
North China	43	84,998

OCEANS.

Shipping Route	Vessels	Tonnage
American	40	165,573
Mediterranean.. ...	8	24,447
Africa	4	18,646
Australia	4	11,546
India	43	127,311
South Seas	19	55,749
East India	13	52,351

INDUSTRIES

Soda Plant for Tientsin.—It is reported that leading Chinese merchants in Tientsin are forming a company for the manufacture of soda, the natural salts of which are very abundant in the Province (Chihli). It is calculated that at the present high price of imported soda the proposed factory, the cost of which is estimated at $300,000, can show a profit of $650,000 a year, or over twice the cost of the plant.

To Manufacture Crucibles in Manchuria.—The first general meeting of the Manchuria Crucibles Factory, Ltd., capitalized at Y. 500,000, was held at Dairen on October 21, when it was decided to erect a factory at Shaohokou.

New Water-Power Plant.—The Hokuroku Water Power and Industrial Co. with a capital of Y.5,000,000, has been formed in Japan to undertake the smelting of iron and steel, and the manufacture of chemicals and electrical apparatus, with a power station which will be erected on the river Itoigawa.

Addition to Shanghai Spinning Industry.—It is reported that two more Japanese cotton mills of 250,000 spindles each will be established in Shanghai. Construction is to begin immediately and the machinery, which has been ordered from England, is expected to arrive early in 1919.

Tokyo Electric Power Plant Expanding.—The Tokyo Electric Light Company will increase its capital to Y.100,000,000 from Y.50,000,000, to permit of it taking a share in the new undertaking of erecting a huge water-power plant on the River Chikuma, which has just been sanctioned by the Government. The new plant will be completed in seven years and will produce 125,000 kilowatts.

Water Power for Kobe Municipality.—The Kobe Municipal Council propose to erect hydro-electric works on a section of the Chigari on the upper reaches of the Muko river, about 20 miles from Kobe. Application for permission to use the river will shortly be made to the authorities. It is proposed to obtain about 5,000 kilowatts on average, with a maximum capacity of 10,000 kilowatts, and it is estimated that the undertaking will cost about Y.3,500,000. When the works are erected it will be possible to supply Kobe with about one-third of its present supply of current.

Japan to Exploit Manchuria-Mongolian Wool.—A woollen manufacturing company, capitalized at Yen 10,000,000, was planned in Osaka, Japan, recently by Mr. Tokuzo Shima, Mr. Shobei Nakatani and other prominent business men. It is understood that the object of the company is to exploit wool produced in Manchuria and Mongolia. When organized, the company will receive the Japanese Government's guarantee for six per cent. interest payment for four years. The capital will be divided into 200,000 shares, a part of which will be offered to the public for subscription.

Steel Making in Japan.—More than a hundred factories have been brought into existence in Japan since the outbreak of hostilities, while those of a most reliable nature now under contemplation number above 30. The total number of ironworks in Japan will in the near future aggregate approximately two hundred. The capital invested in the industry amounts to Y.330,000,000 so far as the works already established are concerned, excluding the Government steel foundry at Yawata, which is the greatest establishment of its kind in Japan. The domestic consumption of steel material is to aggregate 1,177,647 tons in 1918 and 2,266,687 tons in 1928.

FINANCIAL

Chinese Stock Exchange.—The recent action of the Japanese merchants and financiers of Shanghai in establishing a Japanese stock exchange in that city has stimulated the Chinese residents of Shanghai to the inauguration of a similar institution which shall be entirely Chinese. The cotton guild, the cotton-yarn guild, the rice guild, the bean guild, and others are actively interested and it is stated that the central government at Peking has granted a permit for the organization of the exchange.

Japan-China Cotton Spinning Co.—It is announced that the Japan-China Cotton Spinning Co. is being organized by capitalists of Tokyo and Osaka with a capital of Yen 10,000,000 to take over the plant of the International Cotton Manufacturing Co., in Shanghai, which was recently acquired from British interests by Suketaro Kawasaki. The new company will repay to Mr. Kawasaki the Tls. 1,300,000 which he paid for the plant, plus a commission of 10 per cent. The plant consists of 53,000 spindles and 500 looms. Besides this operation the Japan-China Cotton Spinning Co. plans to inaugurate new enterprises in China, including the growing of cotton.

Japanese Specie Holdings.—The specie held by the Government and the Bank of Japan, both at home and abroad, amounted to Yen 1,459,000,000 on October 15, showing an increase of Yen 57,000,000 over the end of September. The details are given below :—

(In Y. 1000)	Oct. 15	Increase Sept. 30
Held by the Government...	718,000	56,000
Held by the Bank of Japan	741,000	1,000
Total	1,459,000	57,000
Held at Home	455,000	—
Held abroad	1,004,000	57,000
Total	1,459.000	57,000

Direct Taxation in Japan.—According to figures recently quoted by the Home Office, the amounts of the direct national taxes paid by citizens in Tokyo and five other leading cities, with an average burden per family as well as per person, are as follows :—

Cities	Amount of taxes	Per family	Per person
Tokyo	...Y.45,431,961	Y.73.268	Y.19.334
Osaka	28,655,073	87.253	18.392
Kyoto	 4,452,434	45.443	7.909
Kobe	11,461,962	90.139	20.529
Yokohama	.. 6,394,596	67.738	13.892
Nagoya	 4,909,317	50.964	11.696

Coins and Notes in Circulation.—Coins and notes in circulation in Japan amounted to Yen 1,261,724,984.92 in value at the end of September, showing an increase of Yen 341,773,562.52 over the corresponding date last year. According to investigations by the Finance Department, the details, classified by the kinds of currency, were as follows :—

		Increase Sept. 30, 1917
Coins	Y.230,772,231	Y.32,252,641
Small notes	68,867,000	68,867,000
Convertible notes	962,085,753	240,653,948
Total	1,261,724,984	341,773,562

Japan's Paper Currency Inflation.—At the end of October, the amount of loans made by the Bank of Japan increased by Yen 409,860,000, owing to the needs for the month-end settlement of accounts and also for foreign exchange purposes, so that the notes issued by the bank made a new record figure of Yen 905,000,000, as has been expected. Consequently, the bank's extra limit issue of notes amounted to Yen 133,350,000. Even after the month-end settlements were completed, some people looking for capital were obliged to go to the Bank of Japan for relief, so that the notes increased still more. It was estimated about November 1 that the entire amount in circulation reached to Yen 980,000,000.

Decreasing Investments in Japan.—During October, according to the Mitsui Bank, the capital invested in new business enterprises in Japan decreased, compared with September, by Yen 84,565,000, that is to Yen 144,540,000; and the investments in extensions increased by 72,728,000, that is to Yen 120,558,000; so that in the total there has been a net decrease of Yen 11,837,000, the total amounting to Yen 265,090,000. This shows a tendency of investments to decline. The grand total from January down showed an increase over the corresponding period of last year by Yen 618,480,000 for new enterprises, to Yen 1,600,000,000, and Yen 368,000,000 for extension, to Yen 1,974,000,000; the total showing an increase by Yen 987,100,000, to Yen 2,760,000,000 in round figures.

Japan's Foreign Trade.—According to Mr. Sakaguchi, a financial authority of the Finance Department of Japan, the exports of that country for ten months, January 1 to October 31, amounted to Yen 1,570,446,000, and the imports to Yen 1 352,045,000, totalling Yen 2,922,000 in round figures; excess of exports over imports having been Yen 218,401,000. Compared with the corresponding period of last year, the exports increased by 18 per cent. whereas the imports by 41 per cent. so that the excess of exports over imports decreased by 20 per cent. Mr. Sakaguchi estimated that—the remaining two months of the year showing a record as has been expected by the Government, and even if the American restrictions on importation of silk may hinder the export trade—the total amount of exports of Japan for the whole year will become about Yen 1,900,000,000. Even if the recently promulgated Imperial Decree on suspension of import duties on foreign rice may affect the import trade, the total amount of imports will become about Yen 1 600,000,000, the total foreign trade amounting to Yen 3,500,000,000. The balance in excess of exports over imports will be between Yen 300,000,000 and Yen 320,000,000, which will be about Yen 240,000,000 or 250,000,000 less than last year's excess of Yen 567,000,000.

Silver Export from China.—In connection with the proposed embargo on the export of silver from China, and Japan's reluctance to agree thereto, it is interesting to quote the following table from the *Japan Financial and Economic Monthly* showing the annual import to Japan of silver coins and bullion from China :—

	Imported (1,000 Taels)
1912	45,098
1913	55,711
1914	16,498
1915	20,717
1916	37,088

Financing China.—Toward the middle of November the Japanese bankers began paying to the Chinese Government the sum of Yen 40,000,000, being advances in connection with the Manchurian and Shantung railway loans, which with Yen 7,000,000, the balance of the Telephone Loan, already paid over will enable the Chinese Government to carry on until the end of the year.

IRON AND STEEL

Steel Prices in Japan.—The Japanese State Steelworks at Yawata opened its sixth sale of iron and steel by public tender on October 22, the quantity being 5,000 tons divided into 105 lots. Of these, 24 lots were not sold by reason of bids not coming up to the reserve which had been set by the Steel works. Prices averaged Yen 315 for round bars, Yen 300 for square bars, Yen 570 for thin plates, and Yen 800 for thick plates, all being somewhat higher than quotations on the open market. The Steel works disposes of about 1,500 tons of steel each month to the Tokai Kokyo Kaisha, the Asano Shipyard and the Osaka Teppan Kaisha, in addition to the sale of its products by auction. This year's revenue of the Works is budgeted at Yen 90,000,000, but owing to high prices of iron and steel it is believed that the actual figure will be about 110.000,000, the net profit in that case being Yen 60,000,000, or an increase of about Yen 20,000,000 over last year.

Provisional Ironworks Projected. — The Military Governor of Anhui Province has informed the Government that he is planning to establish an iron foundry under the name of the Hua Chang Iron Foundry for which a million dollars have been raised. The head office will be at Penpu.

Progress at the Mitsubishi Works.—The Kyonipho works of the Mitsu Bishi Iron Works now have two 150 ton furnaces in operation, and will be able to produce 120,000 tons of pig iron annually, of which 70,000 tons will be supplied to the public and 50,000 tons will be used for steel.

Mining in Shantung Province.—The output of the Chinlingchen Iron Mine on the Shantung Railway is estimated at 50,000 tons during the present fiscal year. Shortage of labor is felt at the mines in the zone of the Shantung Railway, particularly at Tzuchuan Colliery where the daily output has decreased to 900 tons while Fangtzu Colliery is producing only about 100 tons.

Pootung Tramway orders rails.—An order for rails valued at $1,000,000 has been placed with the Hanyang Iron Works by the management of the proposed tramway in Pootung, opposite Shanghai.

Iron Works in Chihli Province.—It is understood that a concern known as the Peiyang Iron Works has been organized for the exploitation of mines in Chihli Province. The capital is to be $4,000,000, of which the Chinese Government will supply a fourth, the Civil Governor of Chili Province another fourth, and the rest by voluntary subscriptions by merchants. The works will be located at Hsuanhuahsien, as several iron mines have already been discovered and are being worked in the vicinity of that place. Lime and coke will be obtained from Chihsien.

COMMERCE

Japan's Market in China.—Japan's trade with China during the closing eleven days of October amounted to Yen 13,723,000 in exports and Yen 11,419 000 in imports, the balance being Yen 2,304,000 in favor of exports. The totals from January 1 to the end of October, were as follows :—

Exports.

	Jan. 1—Oct. 31
Manchuria	Y.34,143,000
North China	73,588,000
Central China	142,832,000
South China	1,810,000
Total	252,173,000

Imports.

Manchuria	Y.16,504,000
North China	30,904,000
Central China	89,771,000
South China	9,760,000
Total	146,939,000

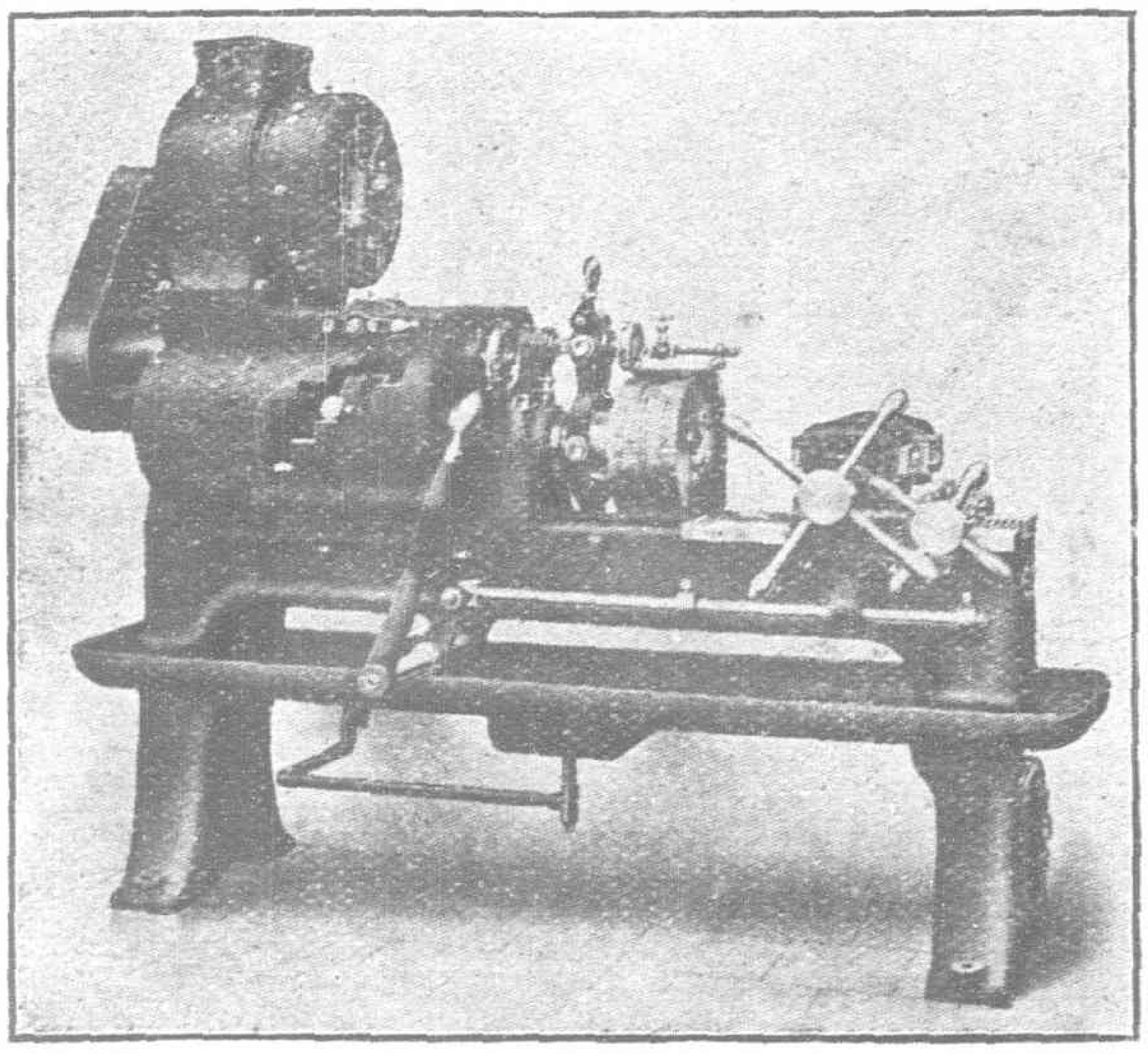
HARBORS, DOCKYARDS, ETC.

Dry Dock for Saigon.—The Indo-China Colonial authorities have decided to construct at Saigon a dry dock to accommodate vessels of about 3,500 tons.

Japanese Lines buy Wharf Space in Shanghai.—A large section of the waterfront opposite Shanghai is being taken up by Japanese buyers. It is reported that the intention is to make a large wharf for Japanese shipping. The property going to the Mitsubishi Company.

Tsingtau Floating Dock now at Kobe.—A Japanese newspaper says of the 16,000-ton floating dock formerly attached to the German port of Tsingtau, which was recently taken by the Japanese to Sasebo for overhauling : "The dock has been rented to the Mitsubishis, who have removed it to Kobe for permanent mooring. It will be ready for service within the current year. The Mitsubishis are in possession of three floating docks, including two of 7,000 tons capacity, in addition to the one above-mentioned."

Heap's Automatic Screwing Machines



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When desired they can be fitted with an All-Gear Head instead of the usual Cone Pulley. The drive can then be by Electric Motor as illustrated, or by Constant Speed Belt.

All these machines are fitted with our Patent Steel Head, which is the most simple and only mechanical Die-head on the market. Springs, with their attendant troubles or other delicate mechanisms, which can get clogged with dirt and the swarf inseparable from a Screwing Machine, do not enter into its construction in any way.

The Die-head opens automatically and the return motion of the carriage closes it ready for the next piece. There are no other levers to set.

If you have threading work to deal with send us particulars and we will offer you a suitable machine.

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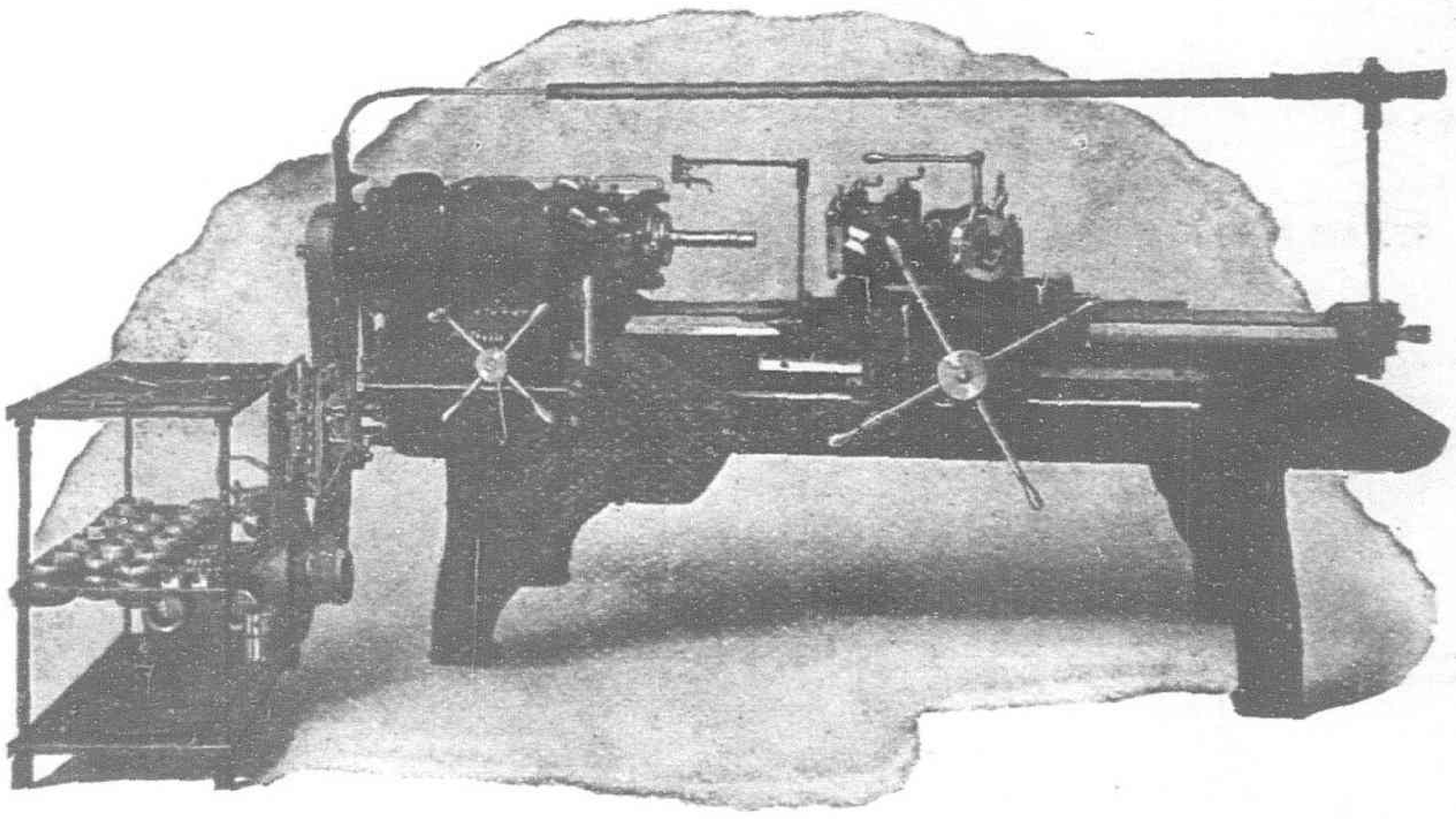
The Flat Turret Lathe **fits the small shop**—even the shop so small that it has only just broken the habit of making a piece at a time. The Flat Turret Lathe **made a lasting reputation** for itself in the days of the small shop, on work which was **put through in small lots.** Its universal tool equipment was specially designed for this condition. The machine has since been **tremendously improved;** the improvements have increased its effectiveness **for small lot manufacturing.**



At the same time, the Flat Turret Lathe is **the standard machine for large-lot manufacturing in big establishments.** The strength, stiffness, power and accuracy of the machine have given it a place held by no other. On bar or chuck work within its range **its output per machine or per dollar of investment is unmatched.**

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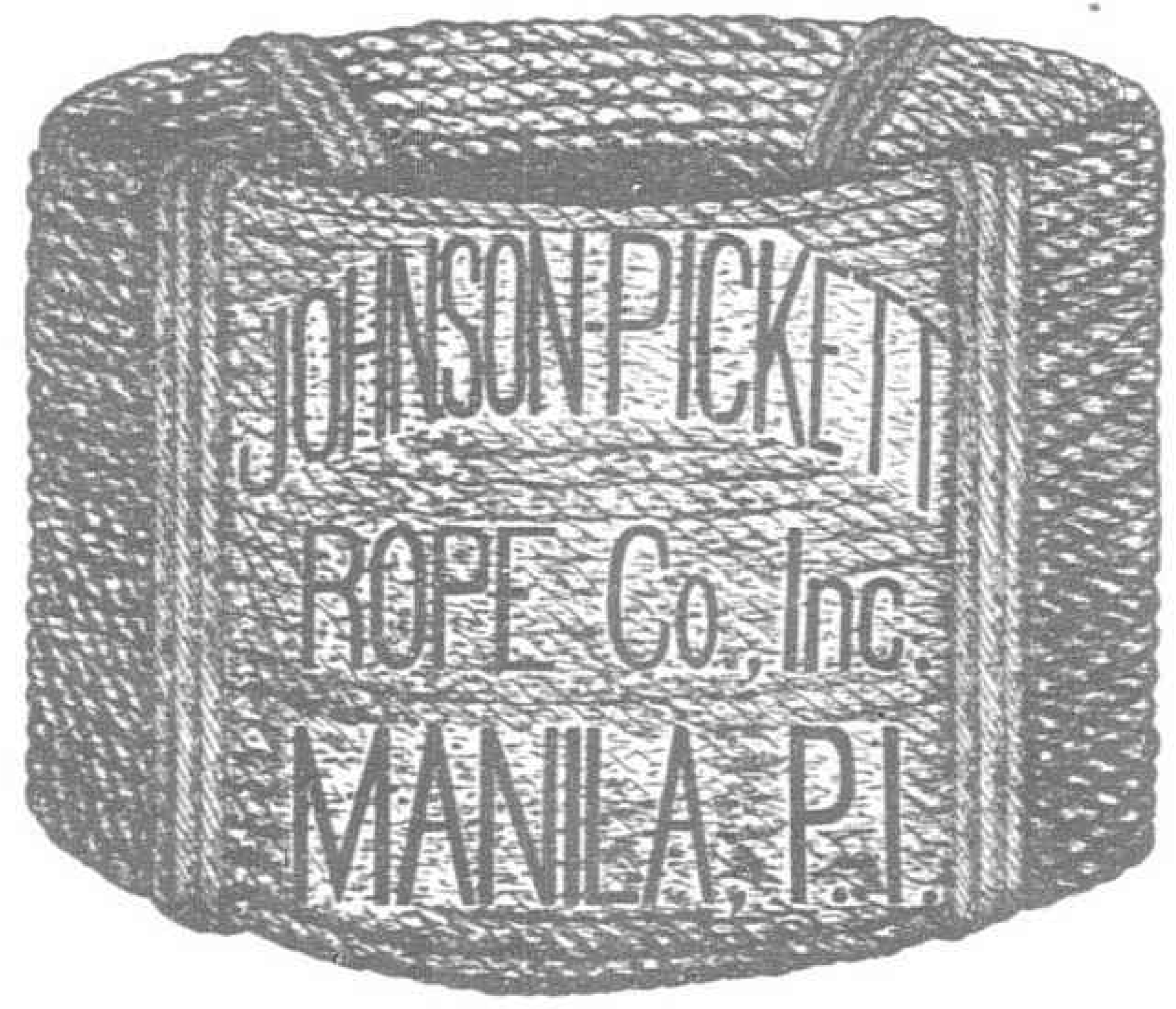

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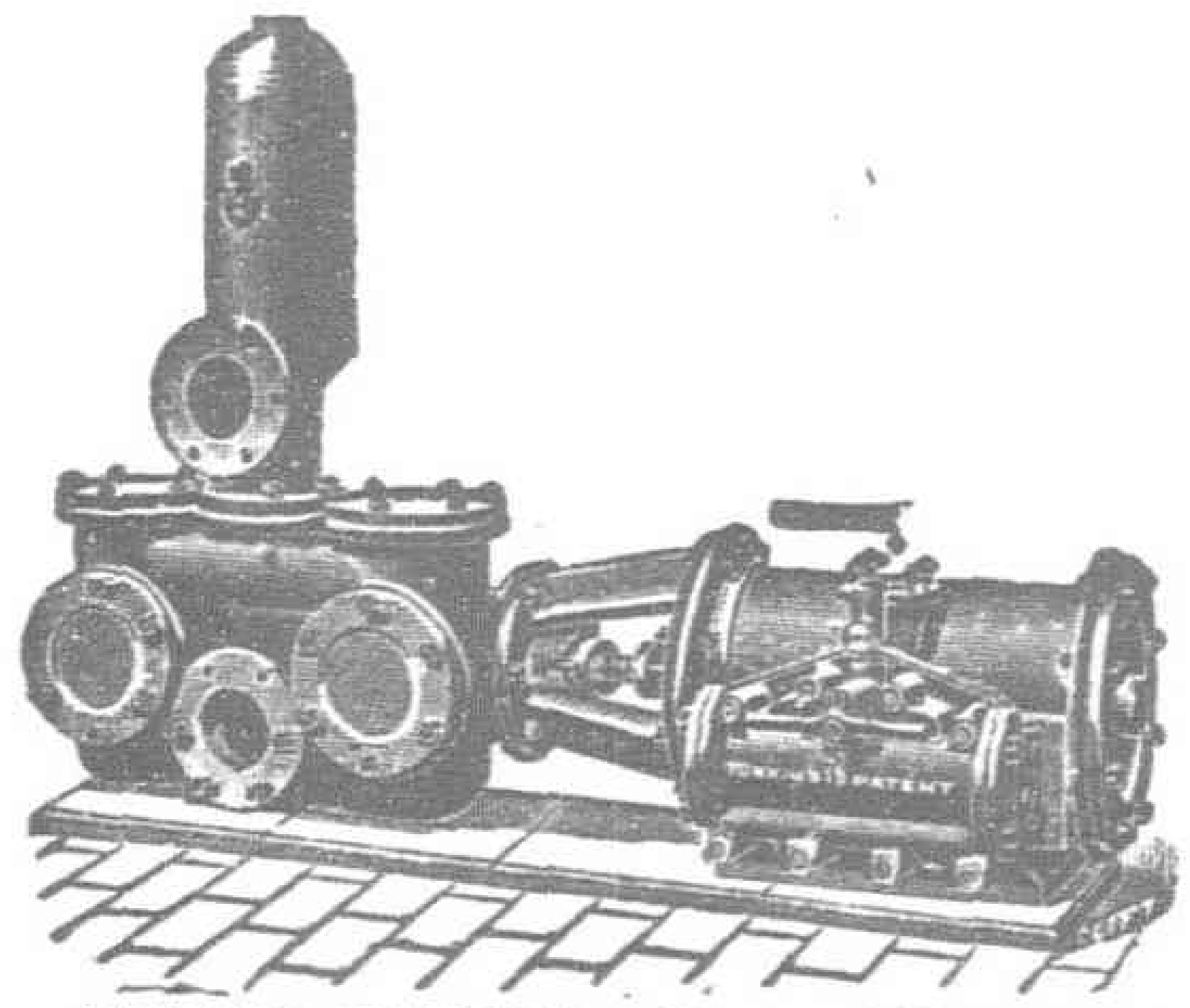

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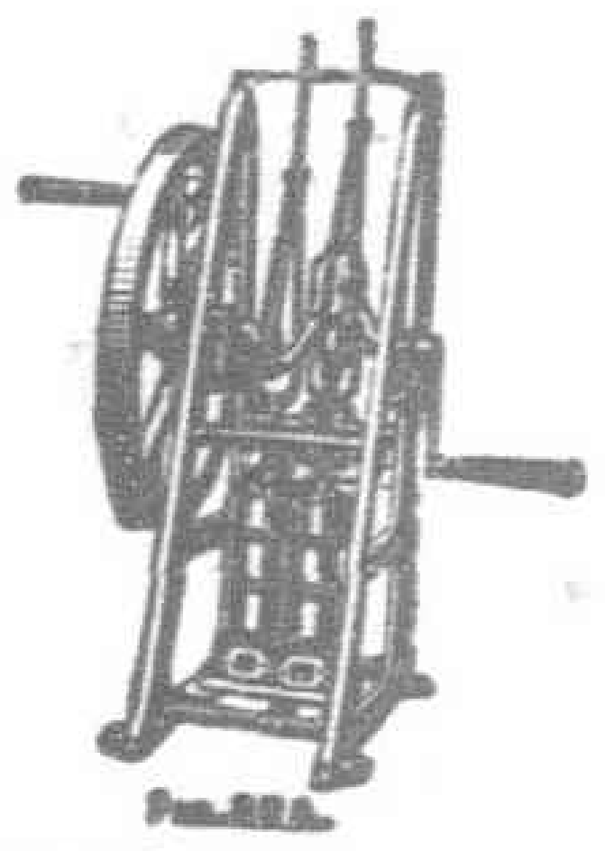

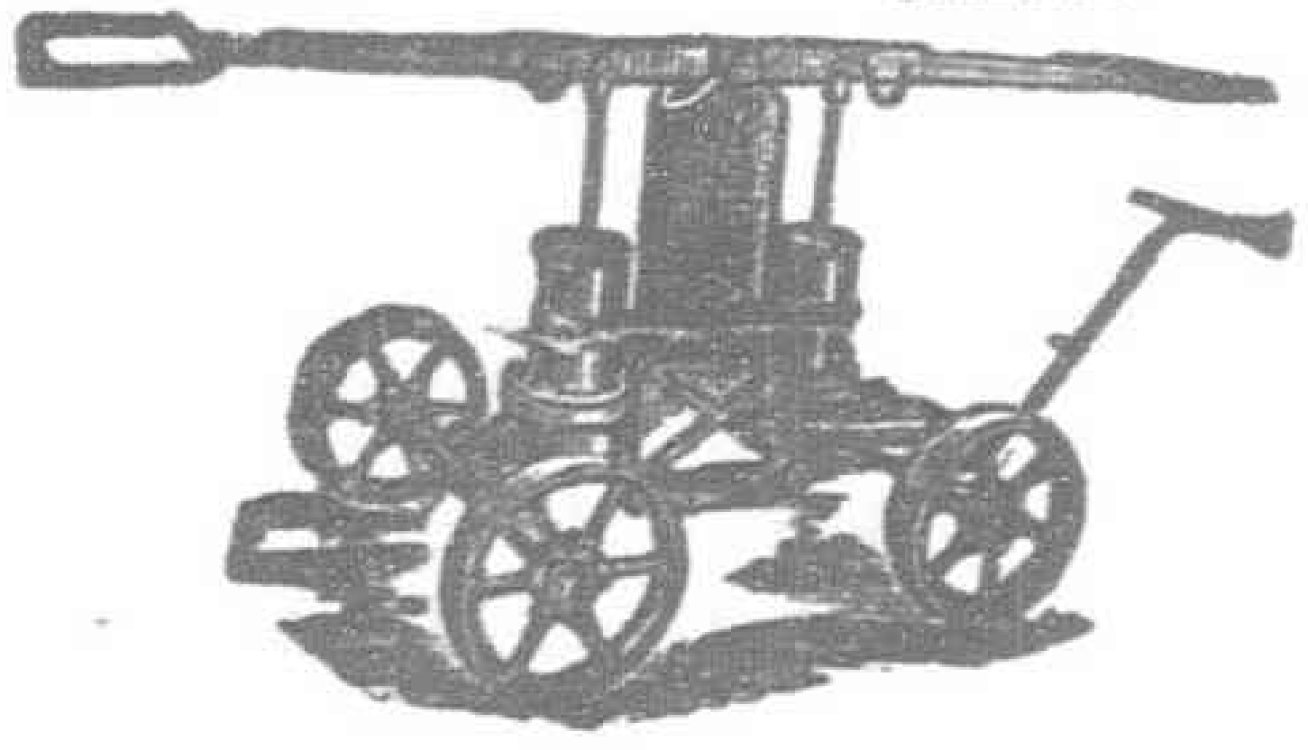

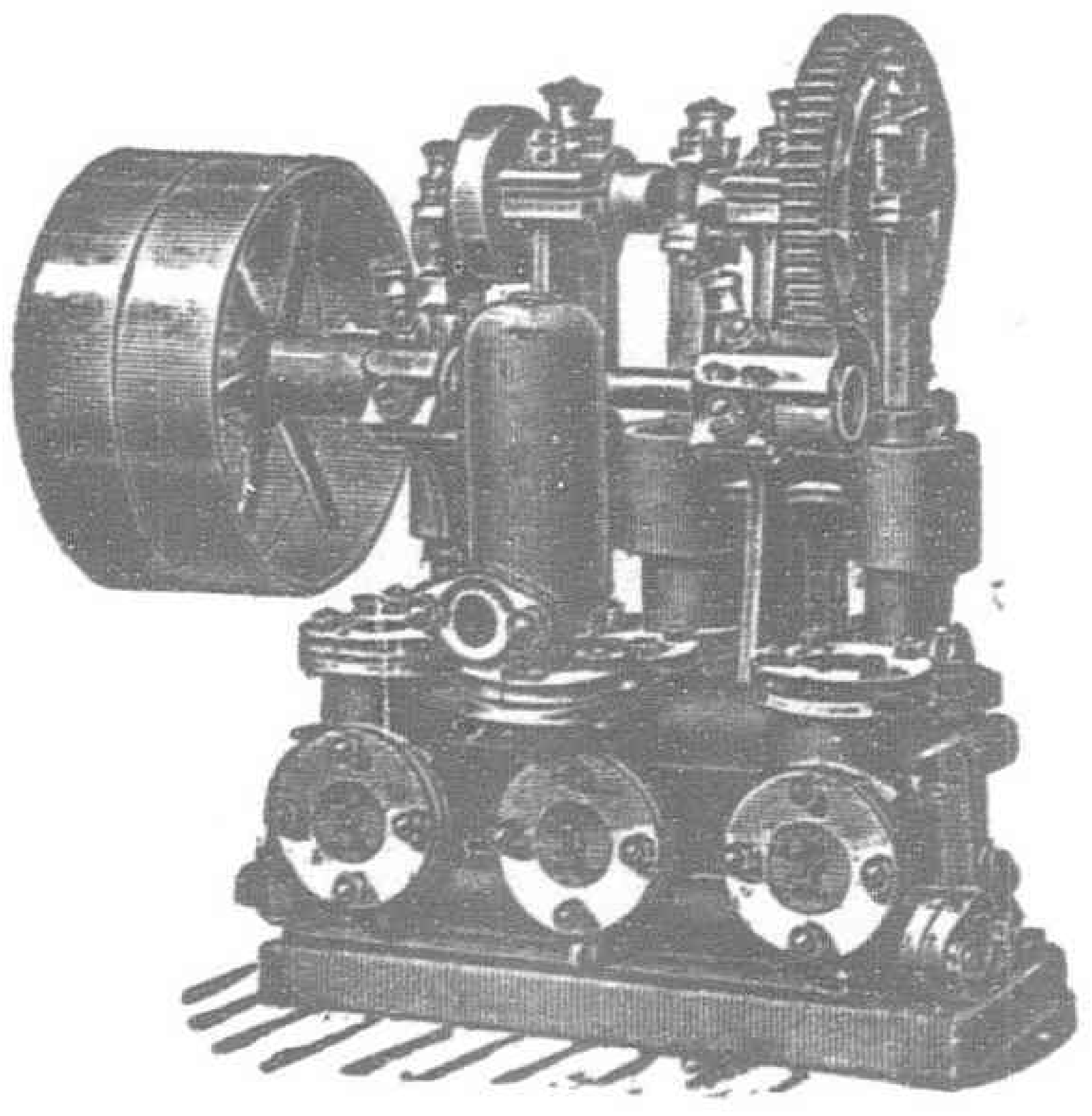

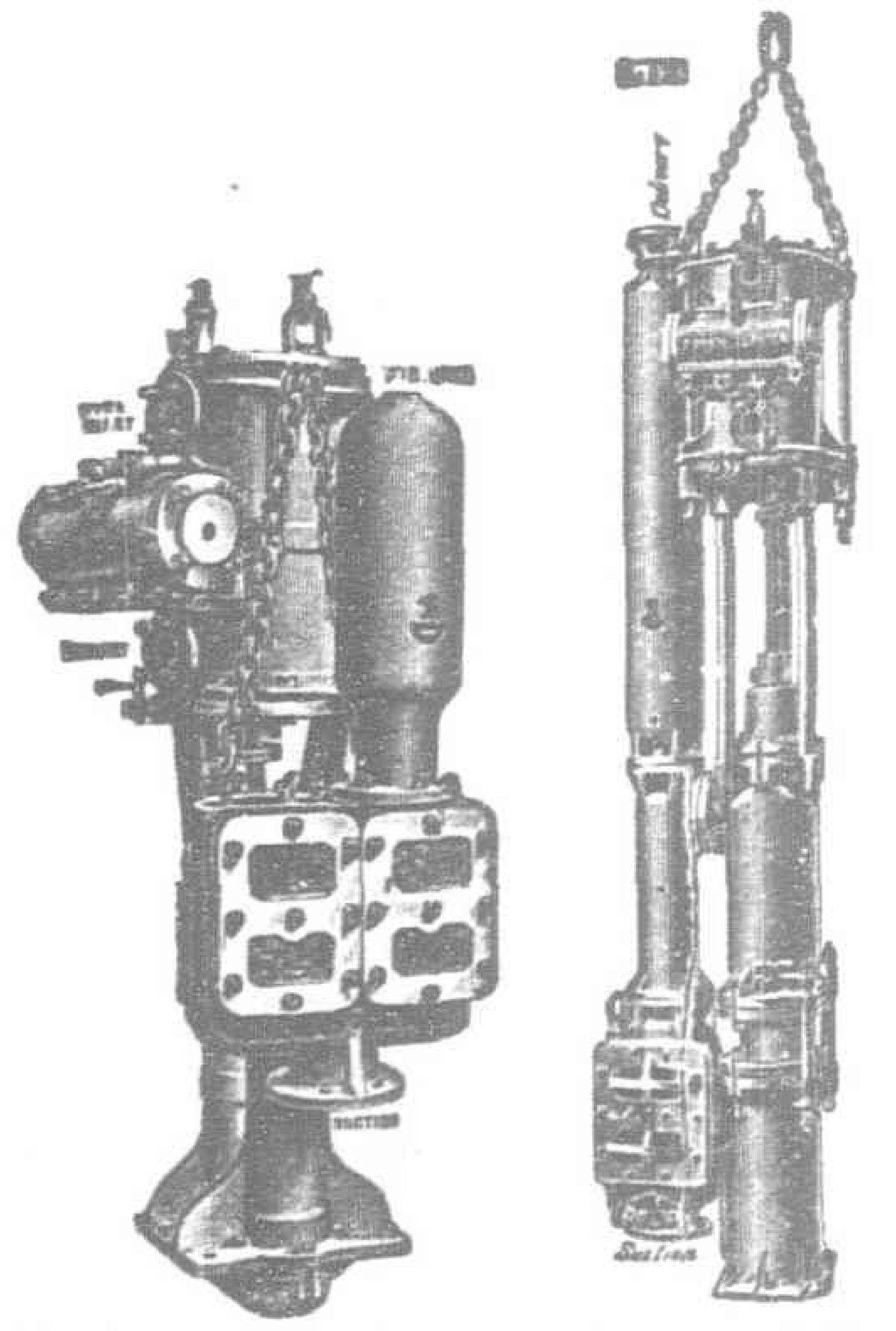

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Fig. 191.

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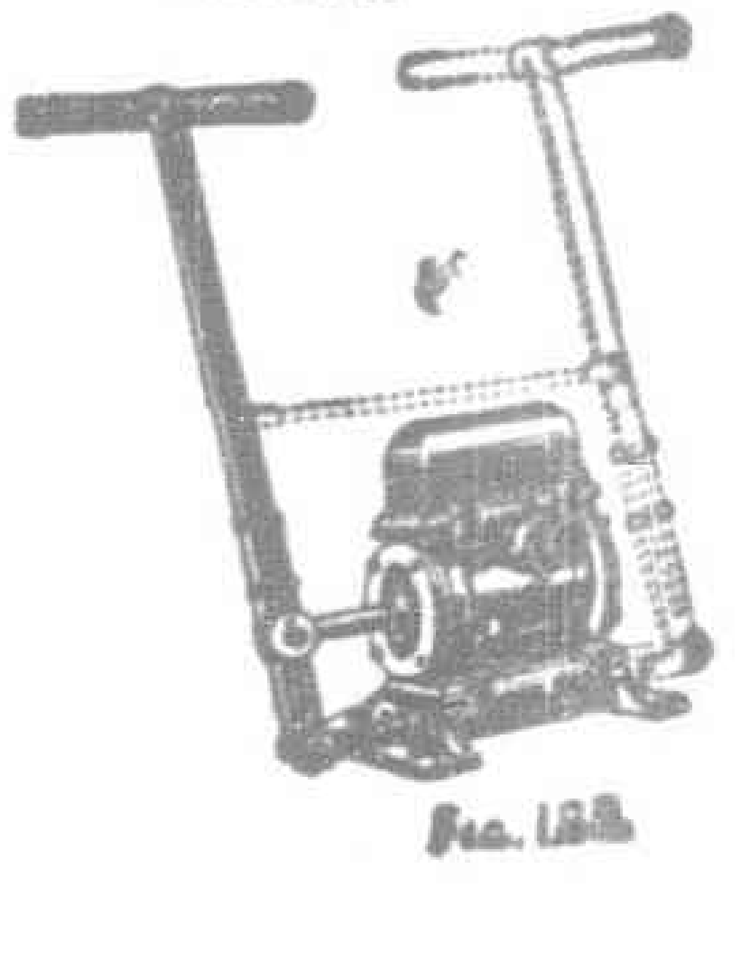

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CAPITAL, FULLY PAID-UP	Y. 30,000,000
RESERVE FUNDS	Y. 30,328,051

Banking Department:

GENERAL BANKING AND EXCHANGE BUSINESS

CAPITAL	Y. 1,000,000
SURPLUS	Y. 10,841,000
DEPOSITS	Y. 150,263,835

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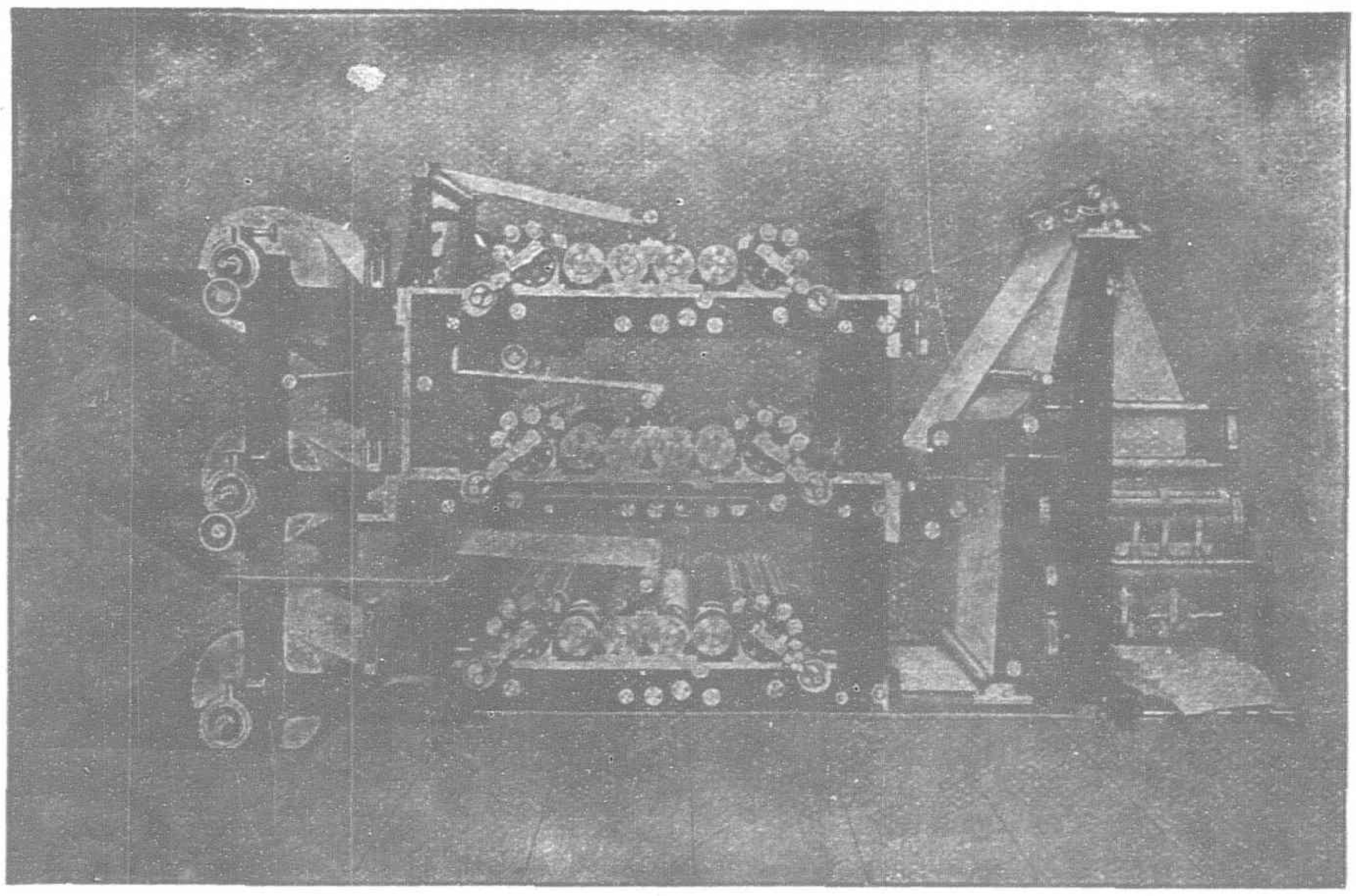

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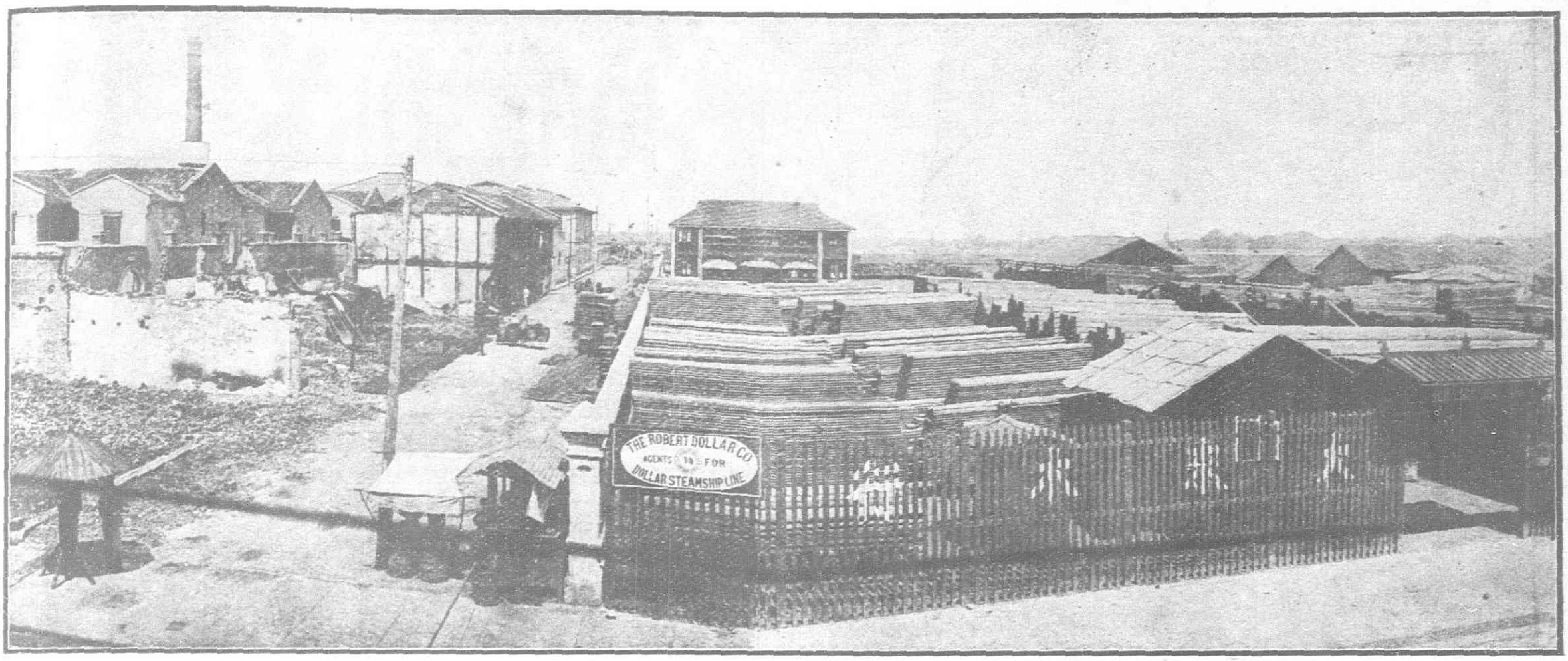

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Trade Mark

YOKOHAMA ELECTRIC WIRE WORKS

YOKOHAMA, JAPAN

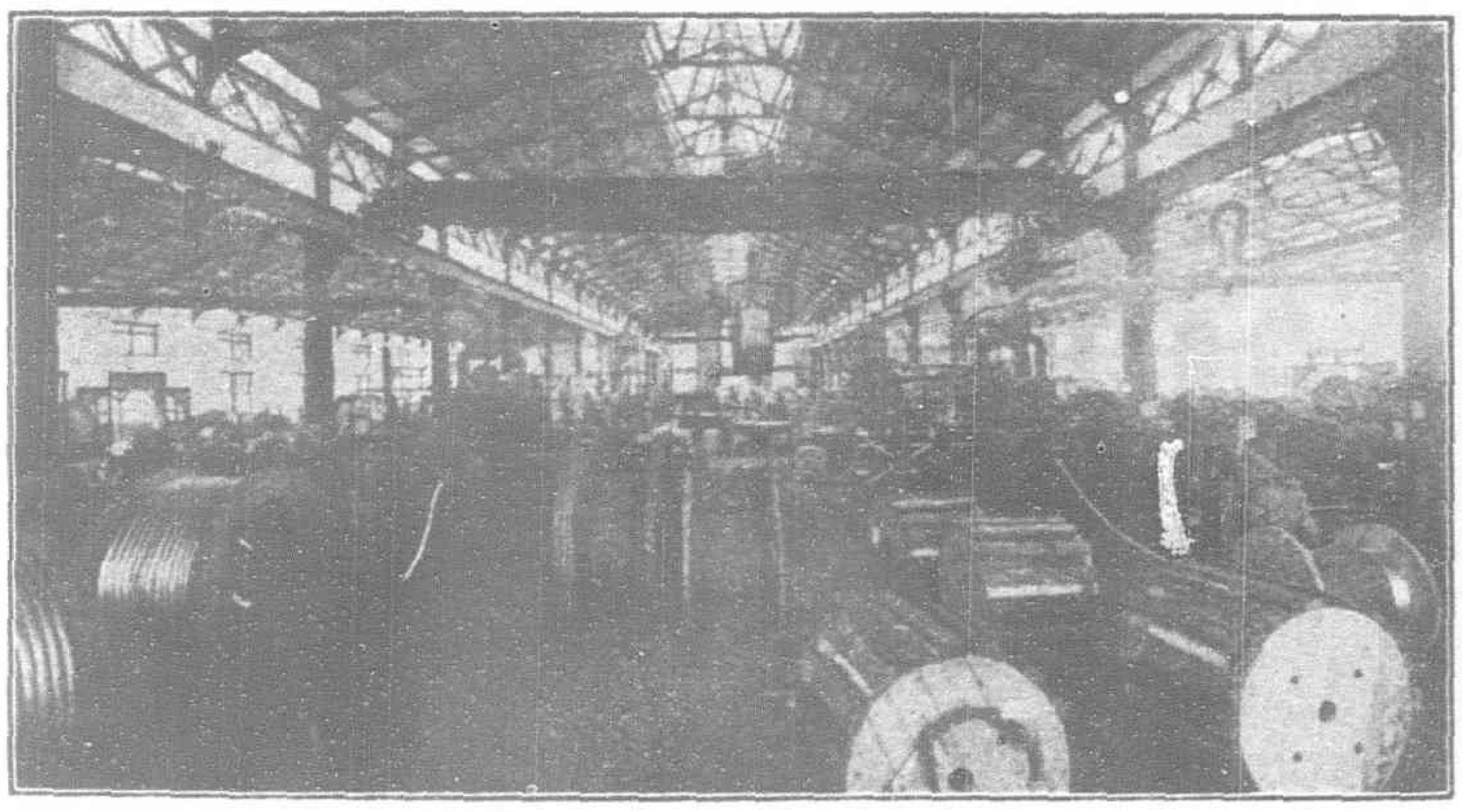
Capital	Yen 5,000,000
Annual Production	„ 20,000,000

Main Works: Yokohama
Cable Works: „
Osaka Branch Works: Amagasaki, Kobe

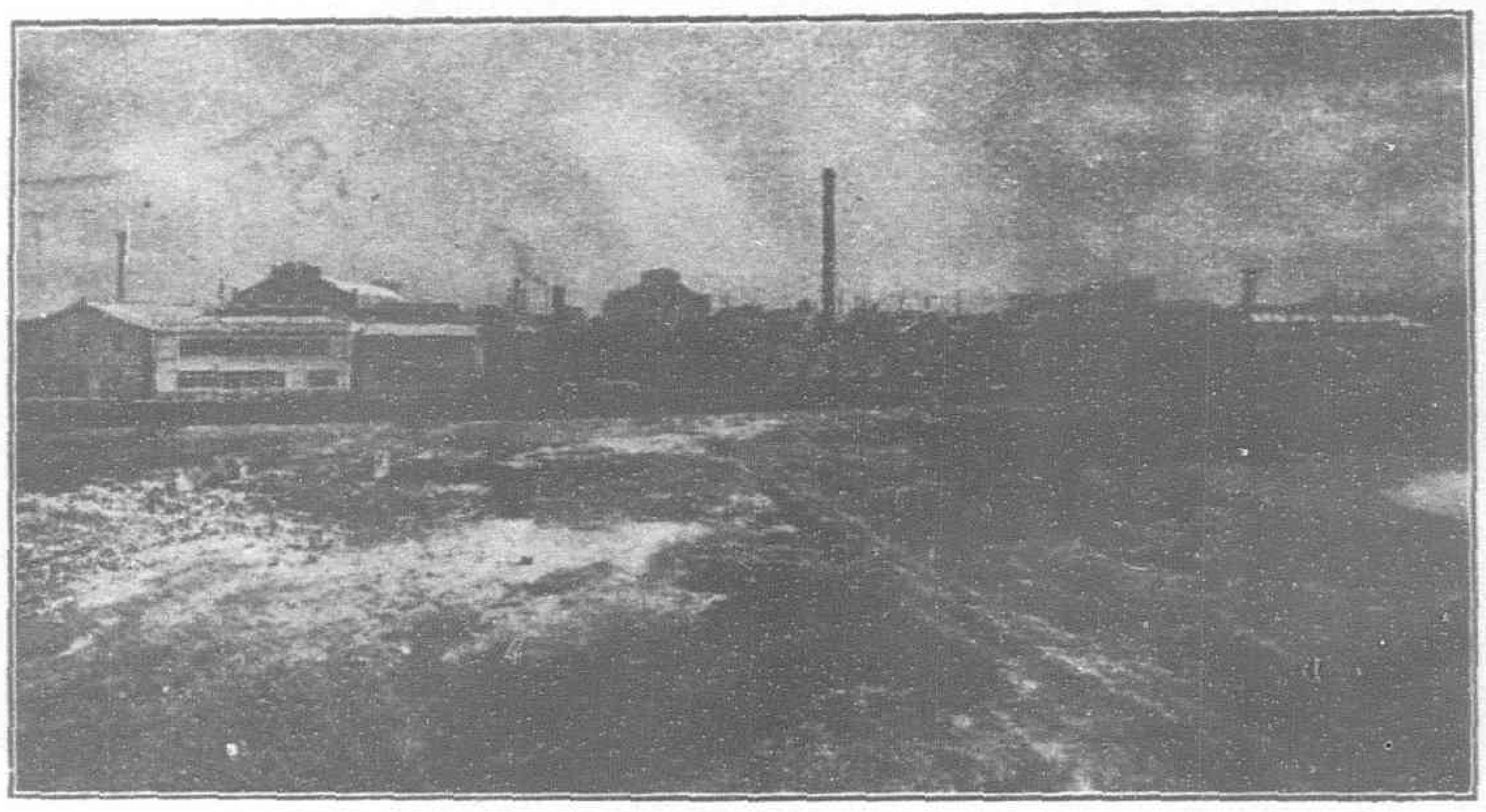
The Largest Wire and Cable Makers in the Orient.
Special Contractors to the Chinese Government.

Manufacturers of all classes of

Electric Wires and Cables for Export.



Lead-excasing Cable Works



Principal Plant of Yokohama Electric Wire Works, Yokohama, Japan

Sole Agent

Trade Mark

MESSRS. FURUKAWA & CO., LTD., TOKYO

BRANCHES AND AGENCIES		
	1B Jinkee Road,	Shanghai
	French Concession,	Hankow
	4 Des Vouex Road,	Hongkong
	Yamagata-dori,	Dairen

EXPLOSIVES

Nobel's Explosives
Company Limited, Glasgow

Blasting Explosives
Explosives for Coal Getting

THE WORLD'S

TRADE MARK

Alfred Nobel

NOBEL'S EXPLOSIVES COMPANY LIMITED

TRADE MARK

GLASGOW

STANDARD

Detonators
Electric Detonators
Safety Fuse

Cordite
Military and
Sporting Ammunition

Agents for China.—Messrs. Jardine, Matheson & Co., Ltd., Hongkong, Shanghai, and Tientsin.
Agents for Japan.—Mitsui Bussan Kaisha, Ltd., Kobe.
Agents for Korea.—Townsend & Co., Chemulpo.
Mitsui Bussan Kaisha, Ltd., Seoul.

NOBEL—GLASGOW

PRODUCTS

- Air Brakes
- Air Compressors
- Battery Charging Devices
- Air Circuit Breakers
- Controllers
- Converters, synchronous
- Disconnecting Switches
- Electrical Fans
- Gears and Pinions
- Generators
- Hoists, electric
- Industrial Heating Devices
- Instruments
- Lamps
- Lightning Arresters
- Line Material
- Locomotives, mining, railroad and industrial
- Measuring Instruments
- Motors
- Motor-generator Sets
- Oil Circuit Breakers
- Panel Boards
- Projectors, searchlight
- Pumps, electrically driven
- Railway Equipment
- Rectifiers
- Regulators
- Rheostats
- Signal Accessories
- Steam Turbo-Generators
- Supplies, general
- Switches
- Switchboards
- Transformers
- Turbines, steam
- Wire and Cable
- Wiring Devices

ACHIEVEMENT

Twenty-five years ago the General Electric Company was founded.

Since then, electricity has sent its thrill through the whole structure of life.

Eager to turn wheels, to lift and carry, to banish dark, to gather heat, to hurl voices and thoughts across space, to give the world new tools for its work—electricity has bent to man's will.

Throughout this period the General Electric Company has held the great responsibilities and high ideals of leadership.

It has set free the spirit of research.

It has given tangible form to invention, in apparatus of infinite precision and gigantic power.

And it has gone forth, co-operating with every industry, to command this unseen force and fetch it far to serve all people.

By the achievements which this company has already recorded may best be judged the greater ends its future shall attain, the deeper mysteries it yet shall solve in electrifying more and more of the world's work.

GENERAL ELECTRIC COMPANY

Principal Office - - Schenectady, N. Y., U. S. A.

Far Eastern Representatives

China:
American General Electric Edison Corporation of China, Shanghai.
Andersen, Meyer Co., Ltd., Shanghai.

Dutch East Indies:
General Electric Company, (of New York), Soerabaya, Java.

India:
General Electric Company, (of New York), Calcutta.

Japan and Korea:
General Electric Company, Yokohama.
Bagnall & Hilles, Yokohama.
Mitsui Bussan Kaisha, Ltd., Tokyo and Seoul.

Philippine Islands:
Pacific Commercial Co., Manila.

50-12

NIPPON ELECTRIC CO., LTD.

TOKYO, JAPAN

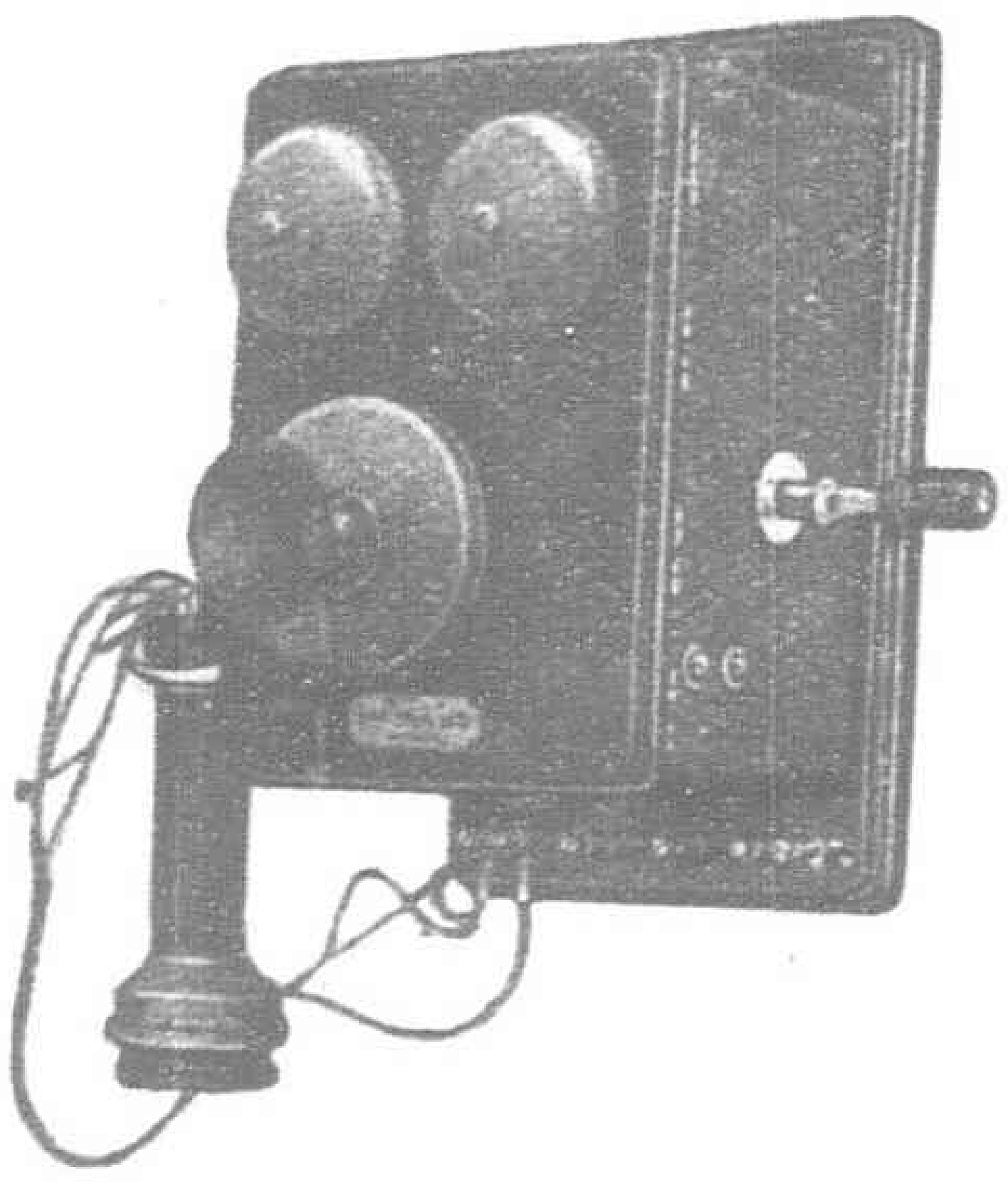
Manufacturers and Suppliers

OF

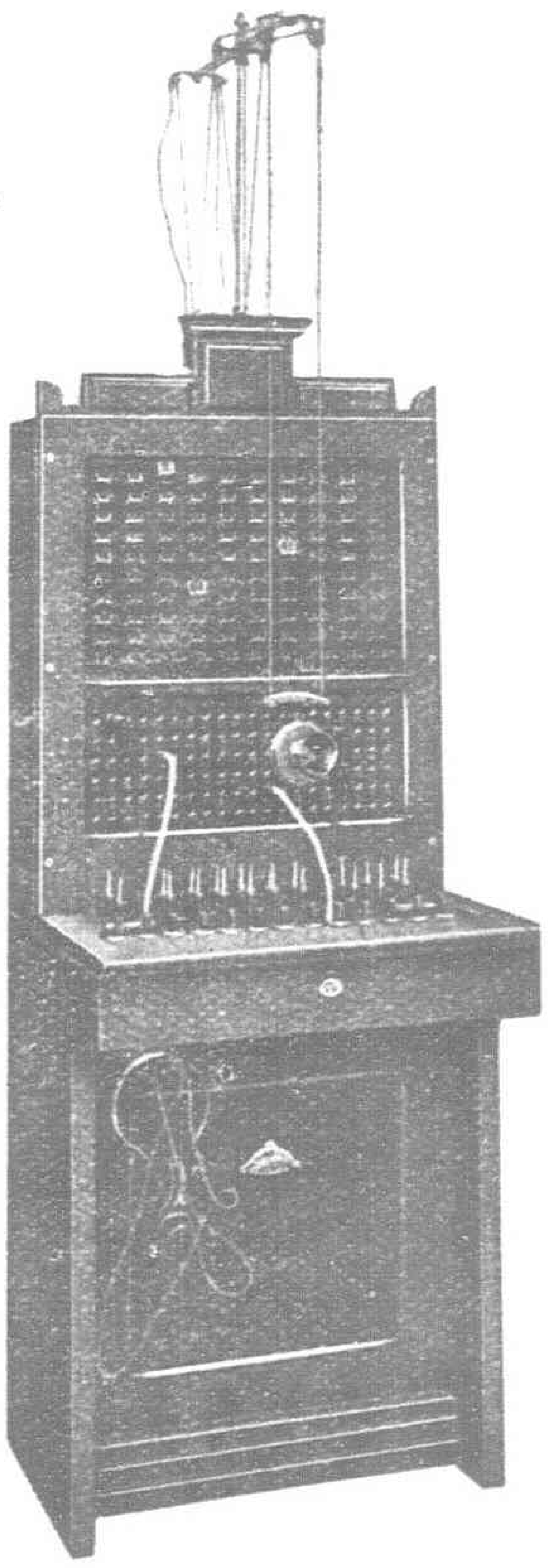
TELEPHONE APPARATUS

Agents in the Empire of Japan for—

Western Electric Company



No. 8 Magneto
Wall Telephone



No. 2101, 100-Line
Magneto Switchboard

No. 108 Magneto
Desk Telephone

Agents in China

CHINA ELECTRIC COMPANY, LIMITED

4 The Bund, Shanghai   4 Shih Chia Hutung, Peking

Branch Offices

OSAKA:
30 Kitahama, Nichome, Higashiku.

DALNY:
39 Mikawa-cho.

SEOUL:
16 Minami, Yonekura-cho.

THE WESTERN ELECTRIC CO.,
INCORPORATED

HEREBY informs its customers and creditors that it has sold its entire business, property, and assets in China to China Electric Company, Limited, as of October 19th, 1918 The business in China of Western Electric Company, Incorporated, will hereafter be handled by China Electric Company, Limited, as sole agents.

All accounts due Western Electric Company, Incorporated, should be paid to China Electric Company, Limited, and all debts of this company will be paid by China Electric Company, Limited.

WESTERN ELECTRIC COMPANY,
INCORPORATED
By
F. F. FAIRMAN,
Manager.

THE CHINA ELECTRIC CO., LIMITED

HEREBY informs the customers and creditors of Western Electric Company, Incorporated, that it has purchased the China business, property, and assets of that company as of October 19th, 1918.

All debts due Western Electric Company, Incorporated, should be paid to this Company, and all accounts payable by Western Electric Company, Incorporated, by its Shanghai office, will be paid upon prompt presentation to this Company.

In connection with taking over the China business of Western Electric Company, Incorporated, China Electric Company, Limited, desires to inform the customers of Western Electric Company, Incorporated, and the electrical trade in general, that it will retain the offices heretofore occupied by that company—4th floor, No. 4 The Bund (Union Building), Shanghai—and that it will have the exclusive agency for China for Western Electric Company, Incorporated, and Nippon Electric Company, Limited, of Tokyo, which companies manufacture and sell telephone, telegraph, and electrical supplies and apparatus of all kinds.

CHINA ELECTRIC CO., LTD.,
By
C. H. MINOR,
General Manager.

（西方電氣公司廣告）

謹啓者本公司於本年陽歷十月十九日起將在中國全部營業事務留存各貨及往來帳目公司生財等售與**中國電氣股分有限公司**承受此後凡本公司在中國所有營業悉歸中國電氣股分有限公司經理該公司並爲本公司在中國唯一經理其本公司應向各家收取帳款統歸中國電氣股分有限公司收取而應付各款亦由該公司照付謹此佈聞

西方電氣公司西經理樊爾門啓

（中國電氣股分有限公司廣告）

謹啓者本公司於本年陽歷十月十九日起承購**西方電氣公司**在中國全部營業事務留存各貨及往來賬目公司生財等此後凡該公司在中國所有營業悉歸本公司經理其該公司應向各家收取賬款統歸本公司收取而應付各款亦由本公司照付本公司並已承受**西方電氣公司及日本東京電氣株式會社**在中國唯一經理之職務除本公司自行製造各電器電料外凡該兩公司所製造電報電話各種電具及他項材料均歸本公司獨家出售其營業地點仍在上海廣東路外灘四號四層樓西方電氣公司舊址凡西方電氣公司各主顧及電業諸公均請照常惠臨賜教曷勝榮幸之至

中國電氣股分有限公司
總理麥南
協理郎國楨
謹啓

THE GREEN ISLAND CEMENT COMPANY, LIMITED.

SHEWAN, TOMES & CO.
GENERAL MANAGERS, HONGKONG

Are You Going to Build?

INSIST ON YOUR ARCHITECT SPECIFYING THE USE OF THE BEST BRAND OF PORTLAND CEMENT IN CONSTRUCTION, IF THE HOUSE OR FACTORY IS TO BE BLOCKS OR TILES, THEY SHOULD BE OF CONCRETE, IF STUCCO, ONLY THE BEST CEMENT SHOULD BE EMPLOYED, IF REINFORCED CONCRETE IS USED, ONLY A STANDARD CEMENT WILL STAND THE TEST, IF YOUR BUILDING IS TO BE FIREPROOF, WATERPROOF, SAFE AGAINST EARTHQUAKE OR TYPHOON, IMPROVING WITH AGE, AND LOWERING THE COST OF INSURANCE, YOU MUST EMPLOY CONCRETE, AND THE BEST CONCRETE CONSTRUCTION IS ONLY SECURED THROUGH THE USE OF

Green Island Portland Cement

GREEN ISLAND CEMENT

is supplied in
BAGS = 250 lbs. net
CASKS = 375 „
IRON DRUMS = 375 „
Also
GLAZED STONEWARE,
HOUSE DRAINS,
SEWER PIPES, AND FITTINGS,
PAVING BRICKS,
TILES,
FIRE BRICKS AND FIRE CLAY.

THE SHANGHAI MUTUAL TELEPHONE BUILDING.
(DAVIES & THOMAS, ARCHITECTS)
Green Island Portland Cement Used Exclusively in its Construction

THE GREEN ISLAND BRAND HAS BECOME THE STANDARD PORTLAND CEMENT OF ASIA, OWING TO ITS PURITY, UNIFORMITY, AND TESTS.

USED BY H.B.M.'S GOVERNMENT IN HONGKONG, UNITED STATES GOVERNMENT IN THE PHILIPPINES FOR ALL IMPORTANT PUBLIC WORKS. Also by H.B.M.'S GOVERNMENT IN SINGAPORE AND FEDERATED MALAY STATES FOR GOVERNMENT BUILDINGS, RAILWAYS AND HARBOUR WORKS

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SHANGHAI
TIENTSIN
NEW YORK

SHEWAN, TOMES & Co

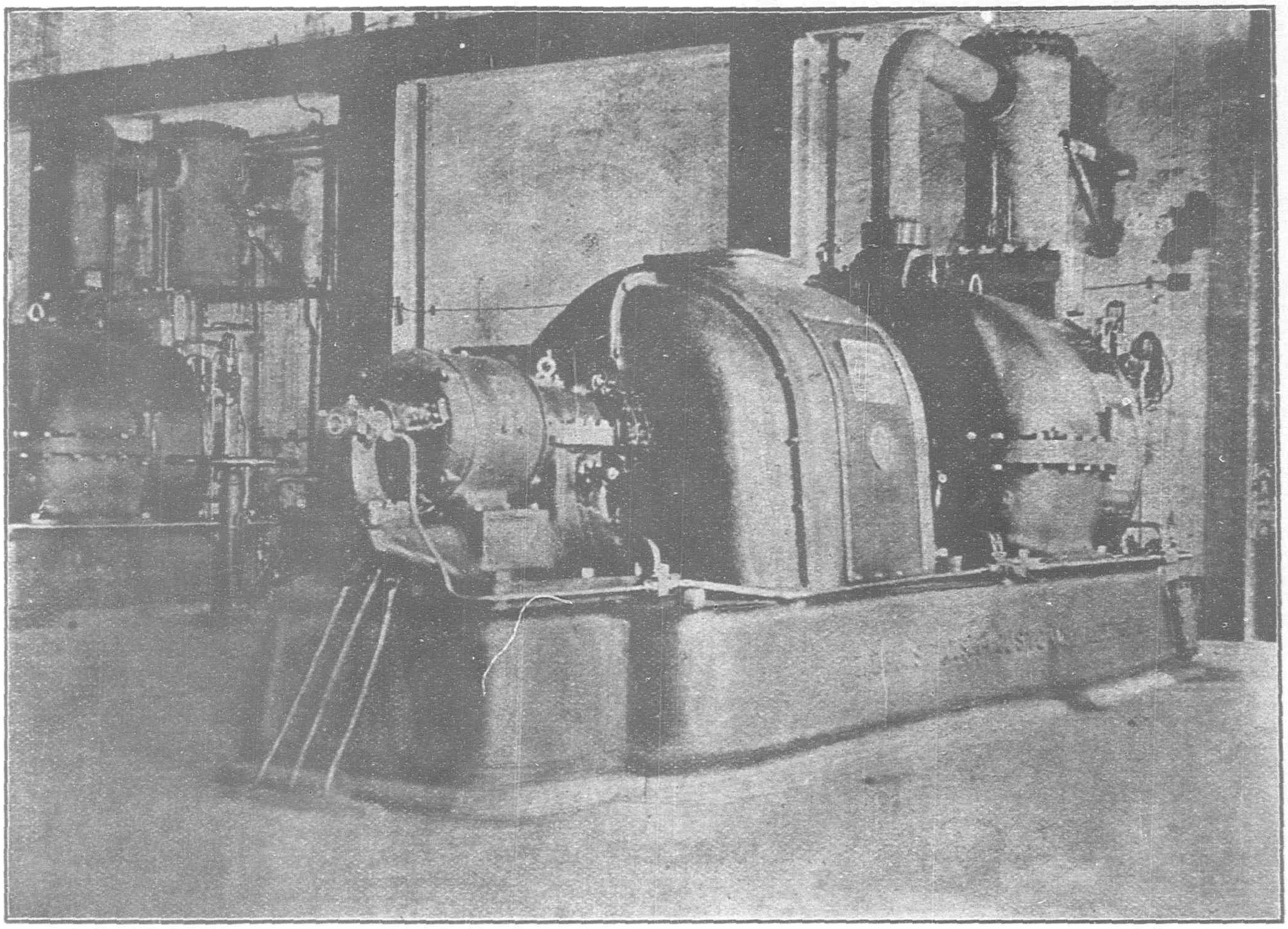
LONDON
OFFICE
32 LIME
STREET
LONDON, E.C.

ENGINEERS AND CONTRACTORS

London—Hongkong—Canton—Shanghai—Tientsin—Kobe—New York

Telegraphic Address:
"KEECHONG," All Branches.

Hongkong Post Office Box: No. 131B
Shanghai Post Office Box: No. 84



750 K.W. Turbo-Alternator Installed in Supply Station (South China)

Sole Representatives in China for—

BRITISH INSULATED & HELSBY CABLES, LTD.
Hongkong and South China.

W. N. BRUNTON & SON, ENGLAND.
Wire Ropes and Fittings

CHUBB & SON'S LOCK & SAFE CO., LTD., ENGLAND.
Hongkong & South China.

JOHN DICKINSON & CO., ENGLAND.
(Hongkong & South China) Lithographic and Printing Machinery.

ROBT. HALL & SONS (BURY) LTD., ENGLAND (SOUTH CHINA).
Looms—Weaving machinery.

PAGET PRIZE PLATE CO., LTD.
Photographic Supplies.

KEIGLEY GAS & OIL ENGINE CO., LTD. (SOUTH CHINA).
Gas and Oil Engines.

CENTURY ELECTRIC CO.
(Hongkong & South China) Single Phase Motors.

CORRUGATED BAR CO., OF U.S.A., THE

THE BARBER ASPHALT & PAVING CO.
"Genasco" Roofing.

THE DURYEA MFG. CO.
Wooster Belting.

THE PITTSBURG TRANSFORMER CO.
Transformers.

NORTH BORNEO TRADING CO.
Lumber and Logs.

TRIANGULAR WIRE MESH.
(Hongkong & South China).

RED WING MOTOR CO., MINNESOTA.
Marine Oil Motors.

H. K. PORTER & CO., PITTSBURGH, PA.
Locomotives.

VICTOR TYPEWRITER CO., SCRANTON, PA. (SOUTH CHINA).
Victor Typewriters.

Overland

TRADE MARK REC.

Drive the "85 Four"

A car of great beauty and strength—a car of absolutely dependable performance, its great power simply controlled.

With the reserve force of the big car, this Overland has all the flexibility of a light one.

To these advantages, add riding comfort. Large wheels, big tyres, cantilever springs, assure smoothness of transit, unusual for cars of its size.

It has a high tension magneto. It is completely equipped. It is economical to maintain.

You will be proud of this Overland, proud of how it looks, proud of what it does. Because of our great production you can drive it with comfort that is financial as well as physical.

We know of no car that compares with it in value.

Agents for Shanghai

THE CENTRAL GARAGE CO.,

2A JINKEE ROAD, SHANGHAI

WILLYS-OVERLAND, Inc.
Toledo, Ohio, U. S. A.

1763

Osaka Shosen Kaisha

(Osaka Mercantile Steamship Co., Ltd.)

HEAD OFFICE: OSAKA, JAPAN

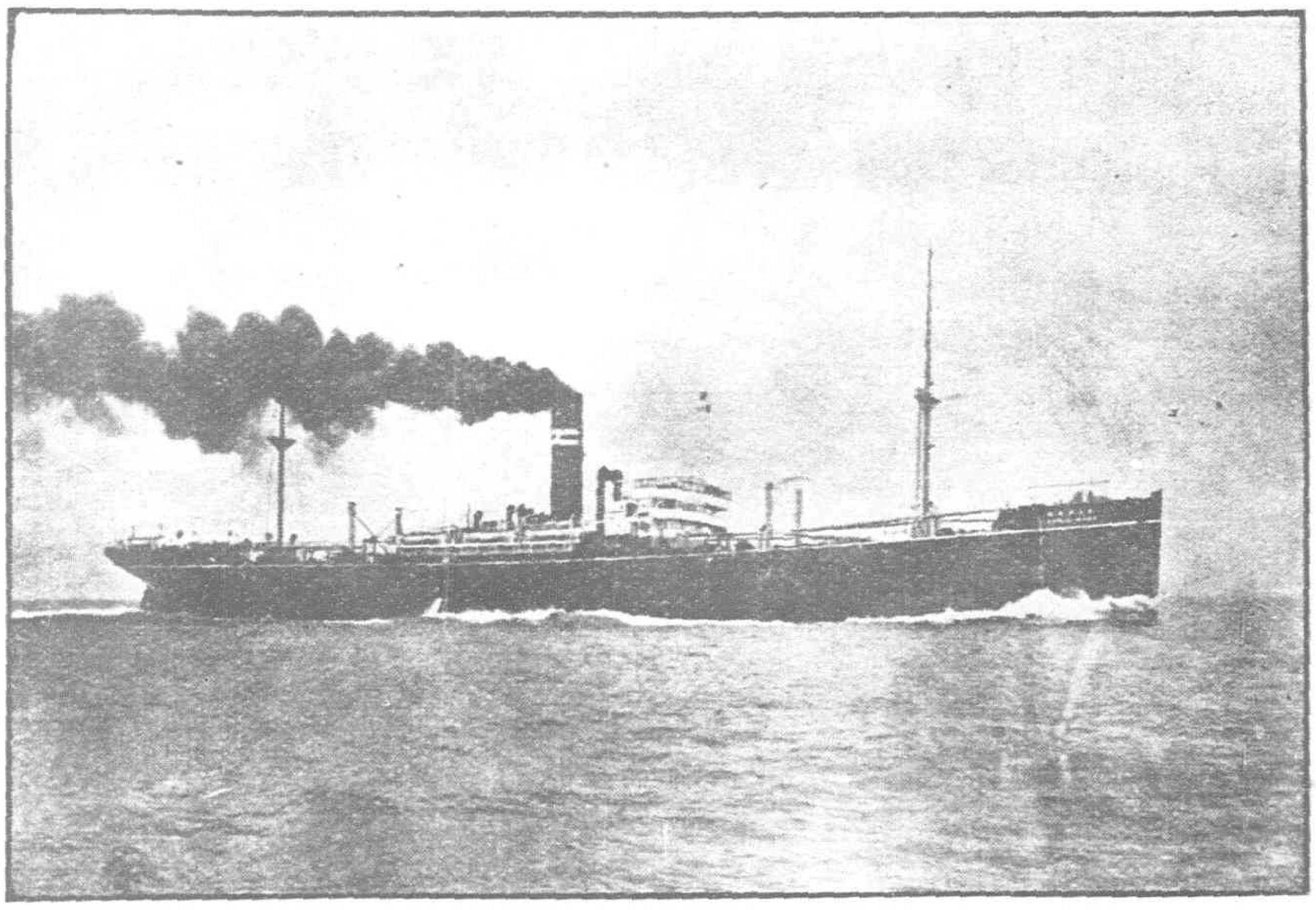
Branches and Agencies at all the principal ports of the World.

Cable Address: "Shosen, Osaka."

Codes Used: A1, A.B.C. 5th Ed.,
Scott's 10th Ed. & Bentley's.

Capital: Y. 50,000,000
Reserves: Y. 59,000,000
Regular Services: 46
Fleet: 450,000 tons gross

The big 4 of O. S. K. 18,000 tons each



S.S. "Africa Maru"
S.S. "Arabia Maru"
S.S. "Manila Maru"
S.S. "Hawaii Maru"

PRINCIPAL REGULAR SERVICES:

SOUTH EUROPEAN LINES, in connection at Bombay with Japan-Bombay Line.

BOMBAY-MARSEILLES LINE.—Monthly—Between Bombay and Marseilles, via Jibuti, Suez and Port Said.

BOMBAY-GENOA LINE.—Monthly—Between Bombay and Genoa, via Suez, Port Said and Naples.

JAPAN-BOMBAY LINE.—Fortnightly—Between Yokohama and Bombay, via Yokkaichi, Osaka, Kobe, Moji, Hongkong, Singapore and Colombo.

HONGKONG-PUGET SOUND LINE.—Fortnightly—Between Hongkong and Seattle, Tacoma and Vancouver, via Yokohama, Kobe, Moji, Nagasaki, Manila and Victoria.

SINGAPORE-PUGET SOUND LINE.—Monthly—Between Singapore and Seattle and Tacoma, via Hongkong, Manila, Keelung, Nagasaki, Moji, Kobe, Yokkaichi, Shimizu, Yokohama and Victoria.

SOUTH AMERICAN LINE.—Bi-monthly—Between Yokohama and Rio de Janeiro, Santos and Buenos Ayres, via Kobe, Nagasaki, Hongkong, Singapore, Durban and Capetown.

JAPAN AUSTRALIAN LINE.—Monthly—Between Hakodate and Sydney, Melbourne and Adelaide, via Yokohama, Kobe, Osaka and Manila.

JAPAN-JAVA LINE.—Monthly—Between Osaka and Batavia, via Kobe, Moji, Keelung, Amoy, Hongkong, Manila, Sandakan and Twao.

SERVICES TO CHINA.—

OSAKA—Dairen Line.—Semi-Weekly.
OSAKA—Tientsin Line.—6 Sailings per month.
OSAKA—Tsingtau Line.—2 Sailings per month.
YOKOHAMA—Dairen Line.—3 Sailings every two months.
TAKAO—Tientsin Line.—2 Sailings per month.

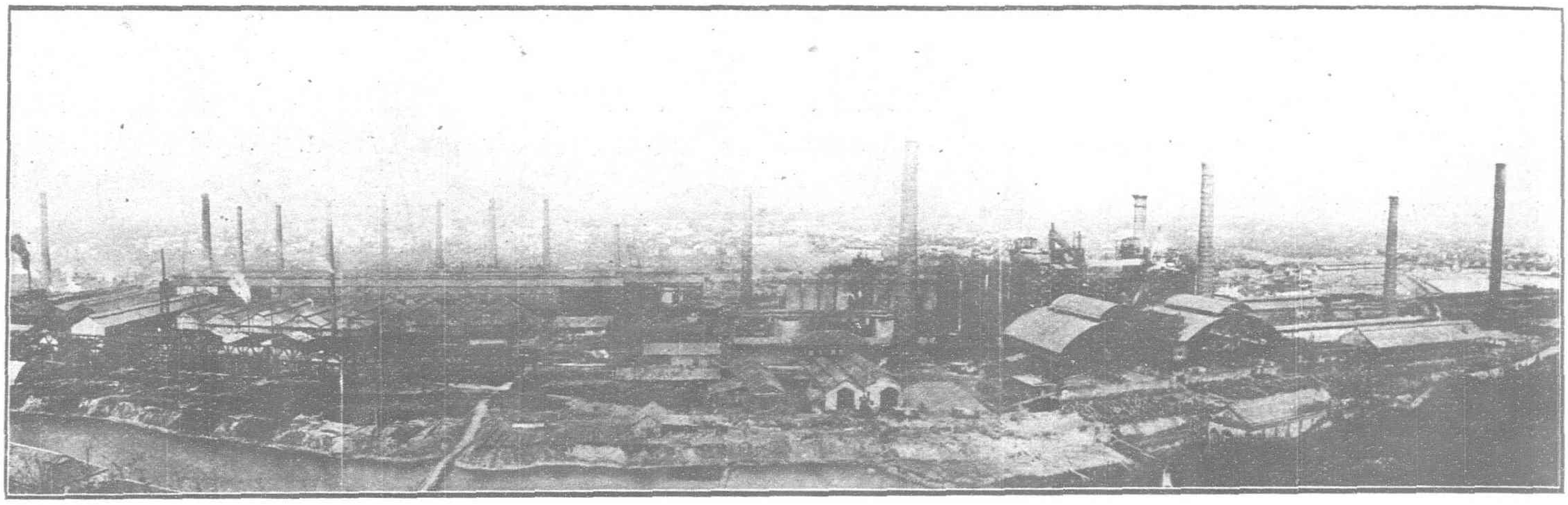
Besides above, numerous Regular Services along the Coast of Japan, Korea and South Seas.

COMPANY'S LOCAL OFFICES IN CHINA

AMOY, CANTON, FOOCHOW, SHANGHAI, TIENTSIN, DAIREN, HONGKONG

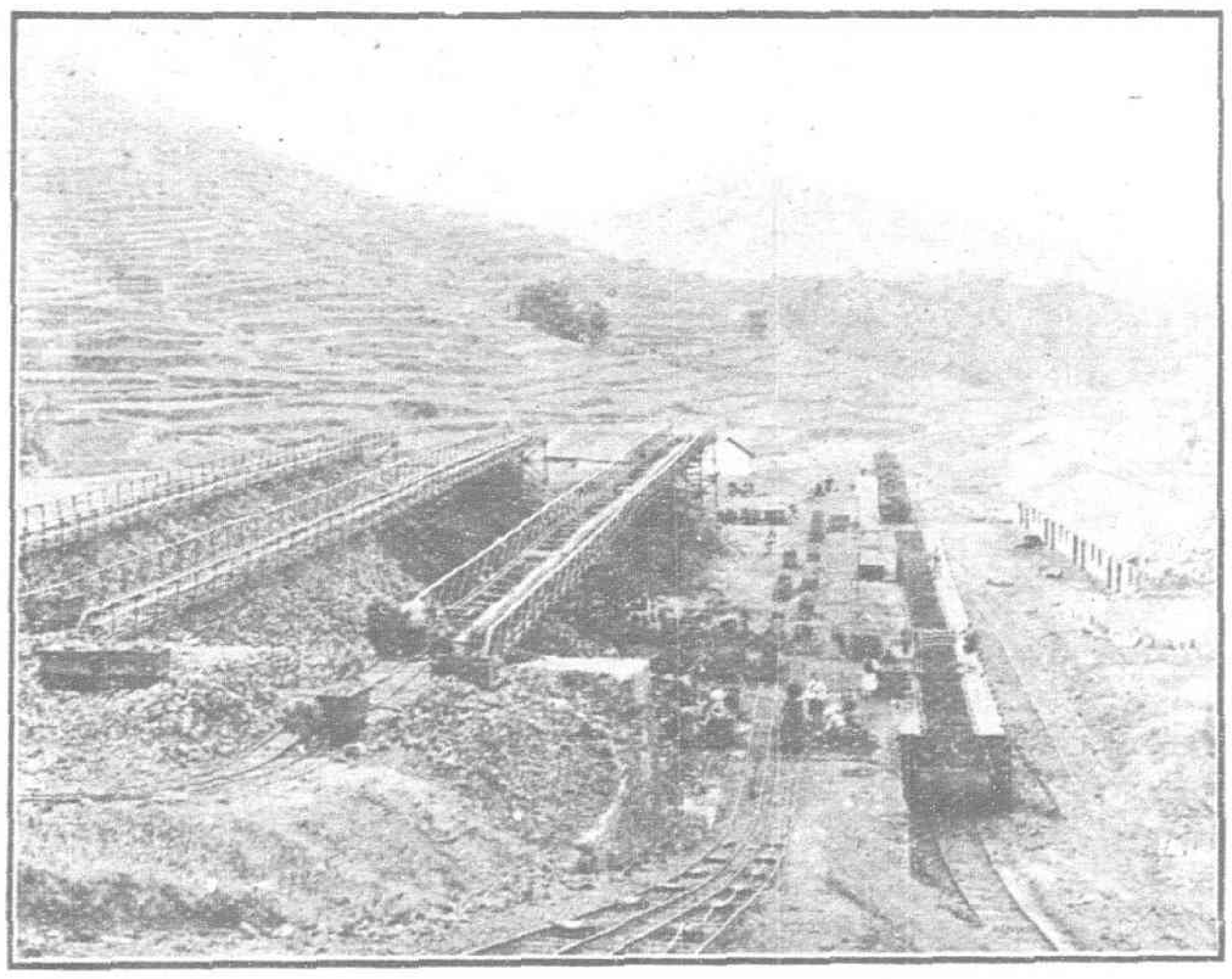
漢冶萍煤鐵廠礦有限公司

THE HAN-YEH-PING IRON AND COAL CO., LTD.

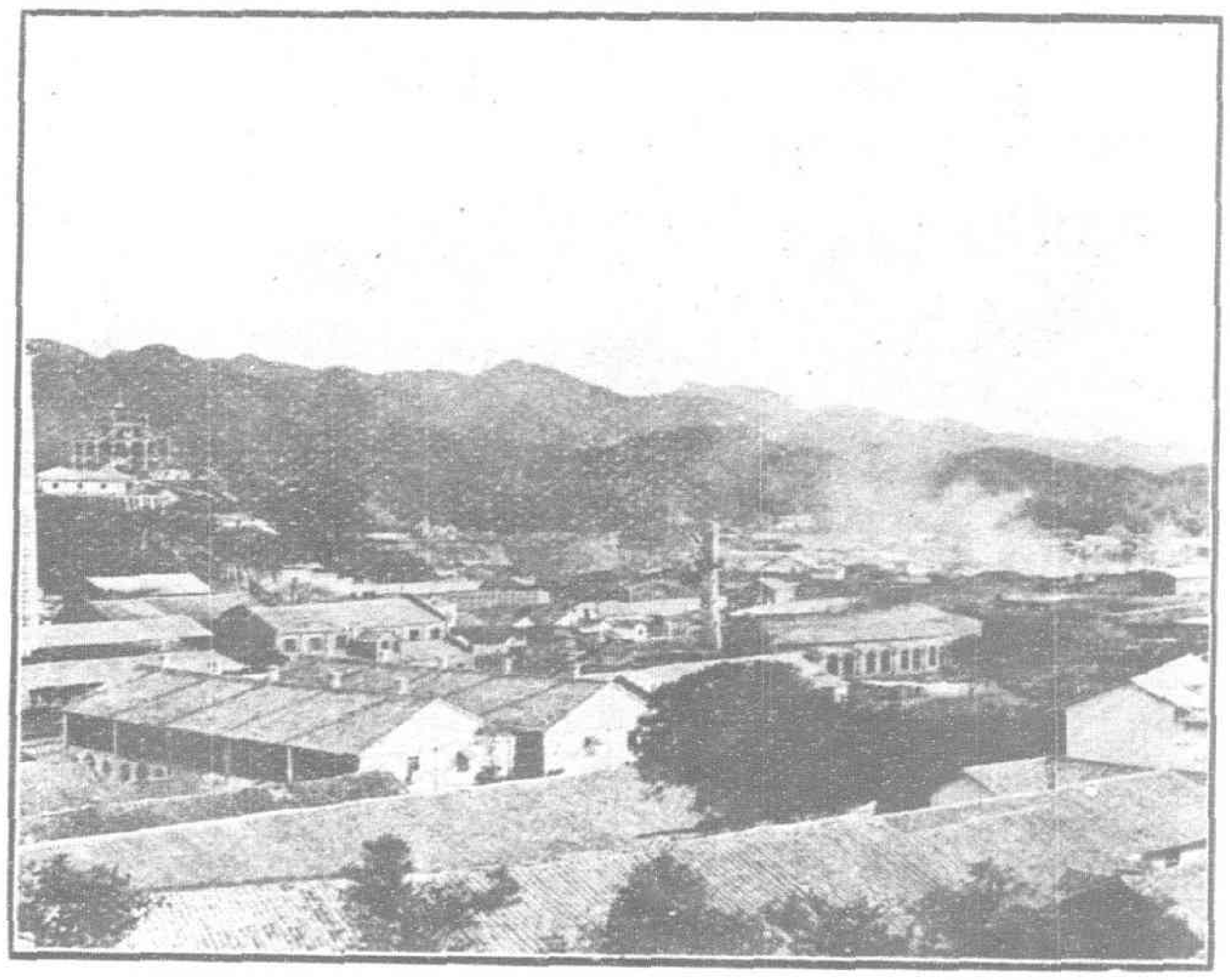


GENERAL VIEW OF HANYANG IRON AND STEEL WORKS

Incorporating The Hanyang Iron & Steel Works, The Tayeh Iron Mines, The Pinghsiang Colliery.



THE TIEHSHAN MINE AT TAYEH



PARTIAL VIEW OF THE PINGHSIANG COLLIERY

PRODUCERS OF High Percentage Iron Ores, Limestones, and Dolomite.

PRODUCERS OF The Pinghsiang Steam Coal, and Pinghsiang Coke.

MAKERS OF Railway Materials including Rails, Fishplates, Dog Spikes, and Bolts and Nuts.

SUPPLIERS TO the Principal Government and other Railways in China.

MANUFACTURERS OF Structural Steel Materials including Steel Plates, Joists, Channels, Equal and Unequal Angles, Rivets, etc. etc.

PRODUCERS OF Pig Iron, both Basic and Foundry, Steel Ingots, Blooms and Billets. Steel Flat, Round, and Square Bars.

Catalogue will be sent free on request to

HEAD OFFICE: 36 Szechuen Road, SHANGHAI.

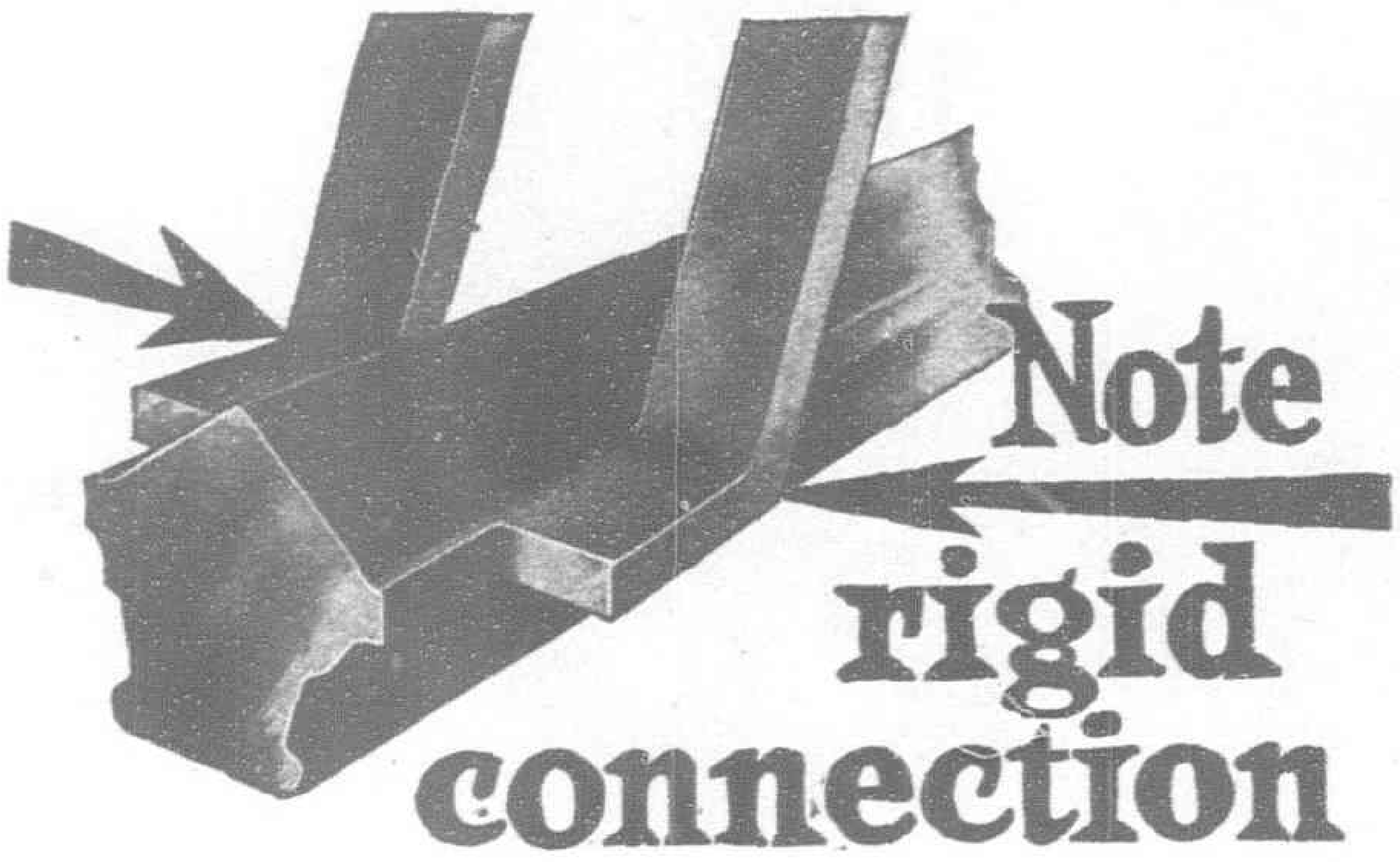
Telegraphic Address: "HANSTEEL," Shanghai.

Codes Used: A.B.C. 5th Edition; Bentley, Engineering 2d Edition; & Western Union.

Economy in Reinforcing Steel

High prices and scarcity of reinforcing steel make it essential to design economically, because a pound of steel wasted or an hour's labor lost is serious. To-day, more than ever before, Kahn Trussed Bars are essential for economy.

Compare by actual figures the Kahn Bar design and a loose stirrup design. You will find a marked saving in the amount of steel and a larger saving in the amount of labor. This saving amounts to many times the slight extra cost required for the shop fabrication of Kahn Bars. The figures before us show a net saving in cost of steel in place of over 12%. Besides, there is an additional saving in time.



KAHN
TRUSSED
BARS

The money saving is only one of the many advantages of Kahn Bars. Rigid connection of shear members also assures increased strength, as shown by tests, better fire protection, and insurance against careless workmanship. If you are building to-day, you should give first consideration to Kahn Bars.

EASTERN AGENCIES

Honolulu Iron Works Co.
Honolulu, T. H.

Wm. H. Anderson & Co.
Manila, P. I.

American Trading Co.
53 Szechuen Road, Shanghai, China.

United Engineers, Ltd.
Singapore, Straits Settlements.

Arracan Co., Ltd.
P. O. Box 47, Rangoon, Burma.

The Bombay Co., Ltd.
P. O. Box 109, Madras, India.

Brown & Co., Ltd.
P. O. Box 300, Colombo, Ceylon.

McKenzies' Saw Mills, Ltd.
Siwri, Bombay, India.

John Chambers and Son, Ltd.
(Chemical Products only)
Auckland, New Zealand
Dunedin, „ „
Wellington, „ „
Christchurch, „ „

Lindeteves-Stokvis,
Dutch East Indies—
Semarang Djorjakarta
Soerabaya Bandoeng
Batavia Medan
Tegal Makassar

American Trading Co.
(Chemical Products only)
40 King St., Sydney, New South Wales,
Australia.

TRUSCON STEEL COMPANY

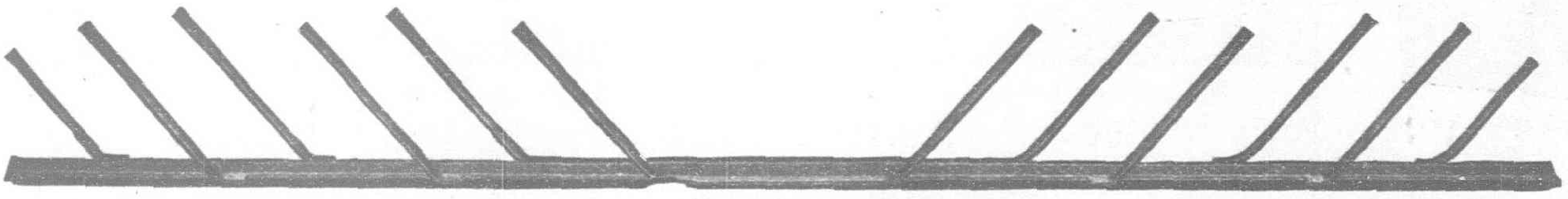
(TRUSSED CONCRETE STEEL COMPANY)

FOREIGN TRADE DEPARTMENT

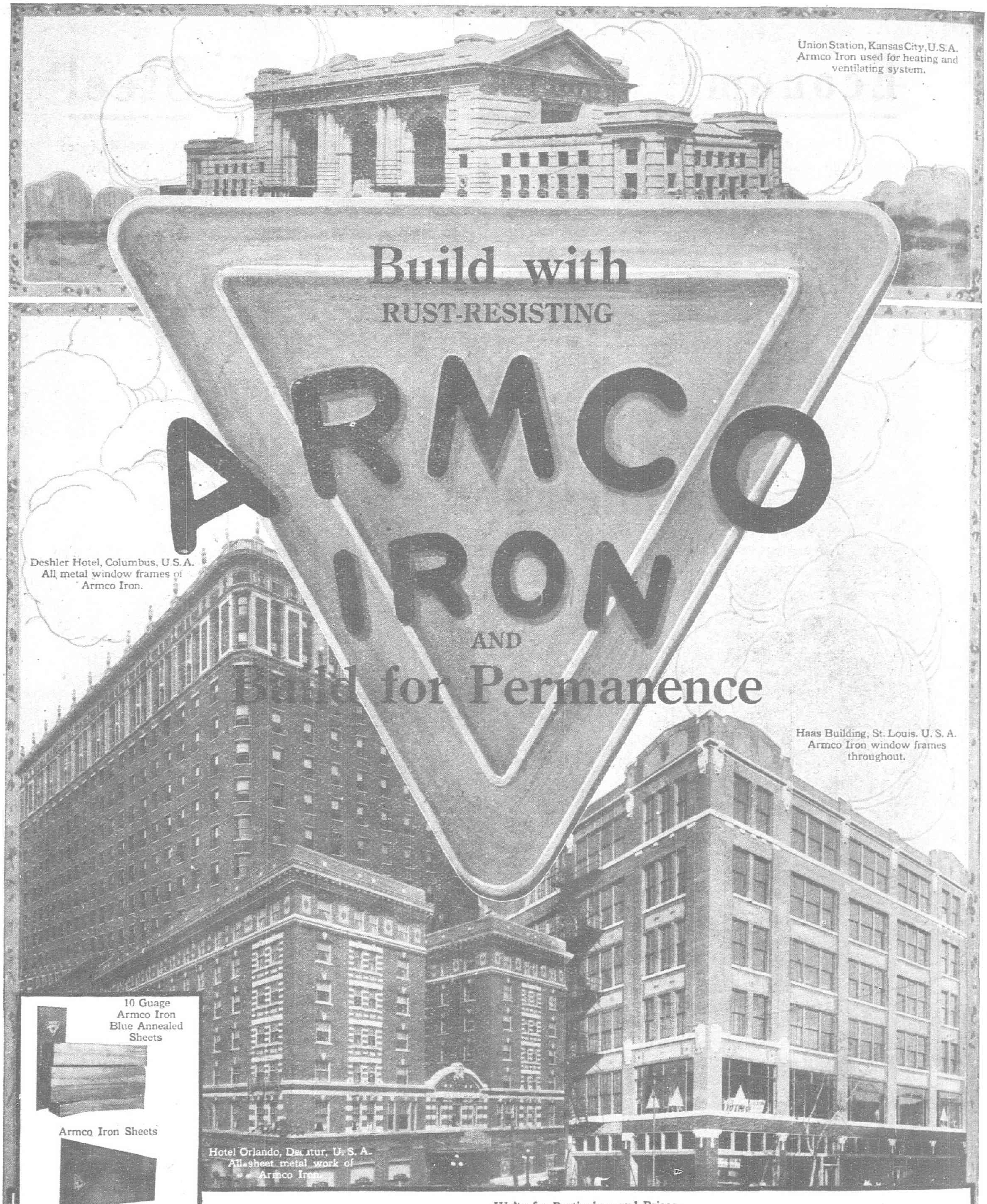
No. 2 Rector Street
New York, N.Y., U.S.A.

KAHN Building Products TRUSSED CONCRETE STEEL CO.

KAHN Building Products TRUSSED CONCRETE STEEL CO.



Kahn Trussed Bar



Union Station, Kansas City, U.S.A.
Armco Iron used for heating and ventilating system.

Deshler Hotel, Columbus, U.S.A.
All metal window frames of Armco Iron.

Haas Building, St. Louis. U. S. A.
Armco Iron window frames throughout.

Hotel Orlando, Decatur, U. S. A.
All sheet metal work of Armco Iron.

10 Guage Armco Iron Blue Annealed Sheets

Armco Iron Sheets

Black and Galvanized

Armco Iron Corrugated Sheets

Write for Particulars and Prices.

THE AMERICAN ROLLING MILL CO.

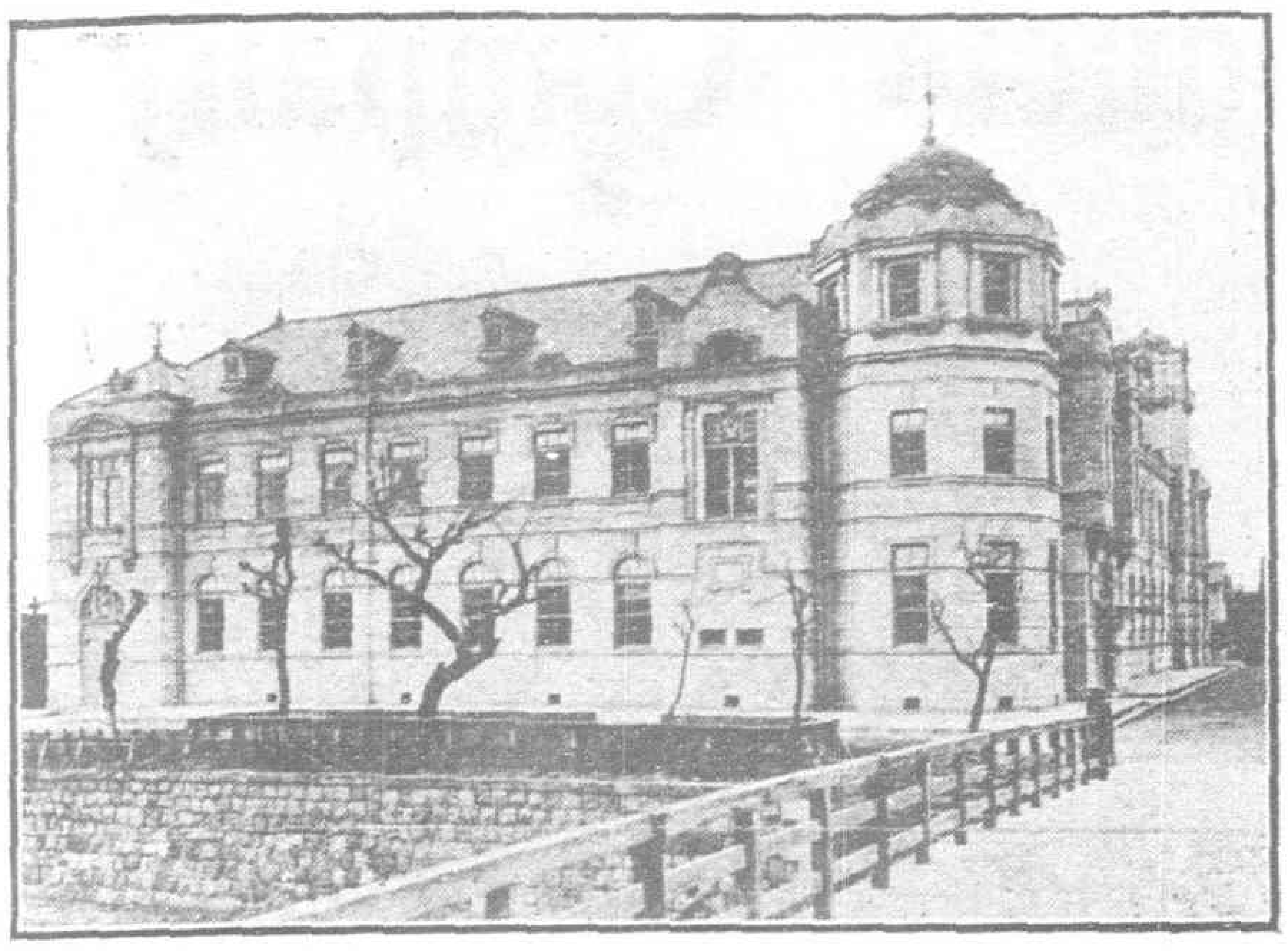
Armco Iron Culverts, Flumes, Sheets, Roofing, Metal Lath and other building products.
Licensed manufacturers under patents granted to the International Metal Products Co.,
MIDDLETOWN OHIO, U. S. A.

Cable Address: "ARMCO" Middletown (Ohio)

Armco Agents:

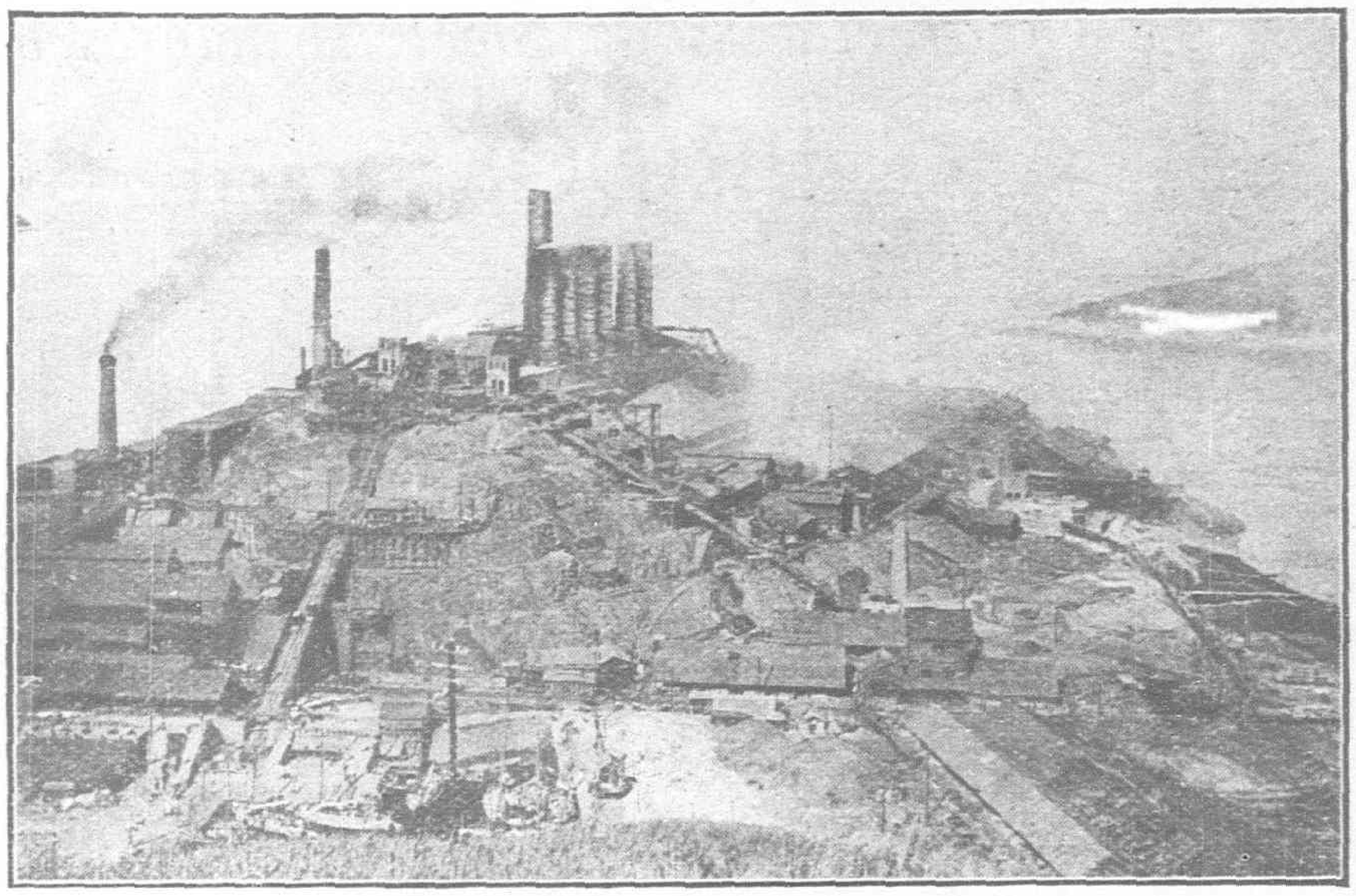
The Chinese-American Co., Shanghai
The Atlantic Gulf & Pacific Co., Manila
Messrs. Bryner & Co., Vladivostok
Messrs. Borneo Co., Ltd., Singapore
The Bangkok Dock Co., Ltd., Bangkok
Messrs. Louis Ogliasrto & Co., Saigon

SUMITOMO GENERAL HEAD OFFICE AND
THE SUMITOMO BANK, LTD.



The Firm of Sumitomo

BESSHI COPPER MINE, SHISAKA, IYO PREFECTURE



OWNERS OF BESSHI COPPER MINES, ETC.

Manufacturers of

Tubes, Plates, Sheets and Bars of Copper, Brass, Bronze and other Copper Alloys, Electric Wires and Cables, Artificial Fertilizer, etc., etc.

WORKS AND DEPARTMENTS

General Head Office	Osaka
Besshi Copper Mine	Niihama, Iyo
Copper Sales Dept.	Kobe
Warehouses	Osaka and Kobe
Wakamatsu Coal Dept.	Wakamatsu, Chikuzen
Copper Works	Osaka
Electric Wire and Cable Works	Osaka
Fertilizer Manufactory	Niihama, Iyo
Sapporo Mine Office	Sapporo
Tokyo Sales Dept.	Hiramatsucho, Tokyo
Kure Sales Dept.	Kure near Hiroshima
The Sumitomo Yoko	Shanghai
The Sumitomo Yoko	Hankow
The Sumitomo Yoko	Tientsin
The Sumitomo Bank, of Hawaii	Honolulu

THE SUMITOMO STEEL WORKS, LTD.

OSAKA, JAPAN

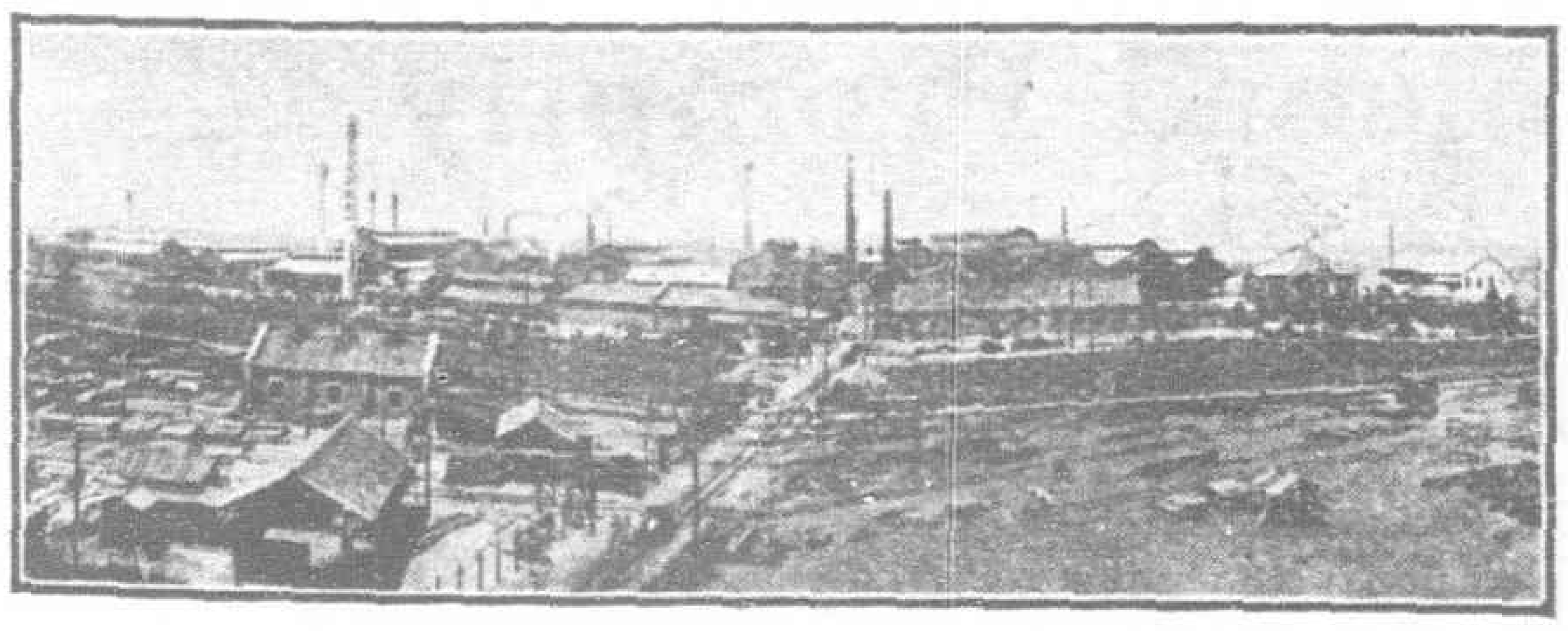
President: Baron K. Sumitomo
Managing Director: Y. Yamashita, Esq.

Manufacturers of

STEEL INGOTS, STEEL FORGINGS, STEEL & IRON CASTINGS

of every description for

RAILWAYS, SHIP-BUILDING YARDS, MINES, HYDRAULIC, ELECTRIC AND OTHER ENGINEERING WORKS, ETC.



THE SUMITOMO STEEL WORKS, LTD.

THE SUMITOMO BANK, LTD.

OSAKA, JAPAN

Cable Address: "SUMITBANK"

Established March, 1912

(Successors to the Sumitomo Bank)

Subscribed Capital	**Yen 30,000,000**
Paid-up Capital	**„ 22,500,000**
Reserve Fund	**„ 4,600,000**

President:

Baron K. Sumitomo

Managing Directors:

K. Yukawa, Esq. S. Yoshida, Esq.
T. Kanoh, Esq. N. Yatsushiro, Esq.

Branches:

Tokyo, Yokohama, Nagoya, Kyoto, Kobe, Hyogo, Onomichi, Nishama, Kure, Hiroshima, Yanai, Shimonoseki, Moji, Wakamatsu, Hakata, Kurume, Shanghai, Hankow, Bombay, London, New York, San Francisco, Seattle, Etc.

Agents:

Lloyds Bank, Limited, London.
National City Bank of New York, New York.
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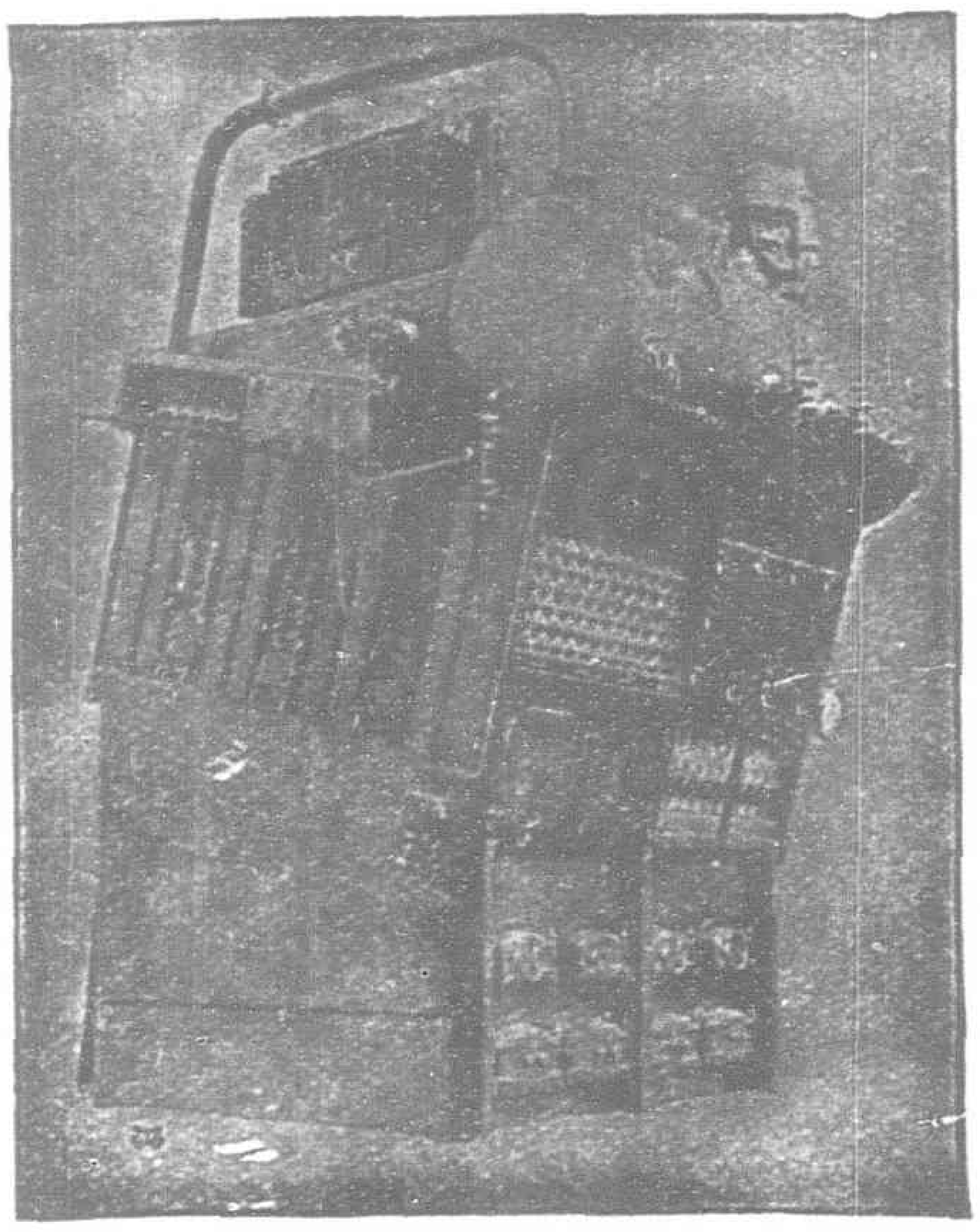

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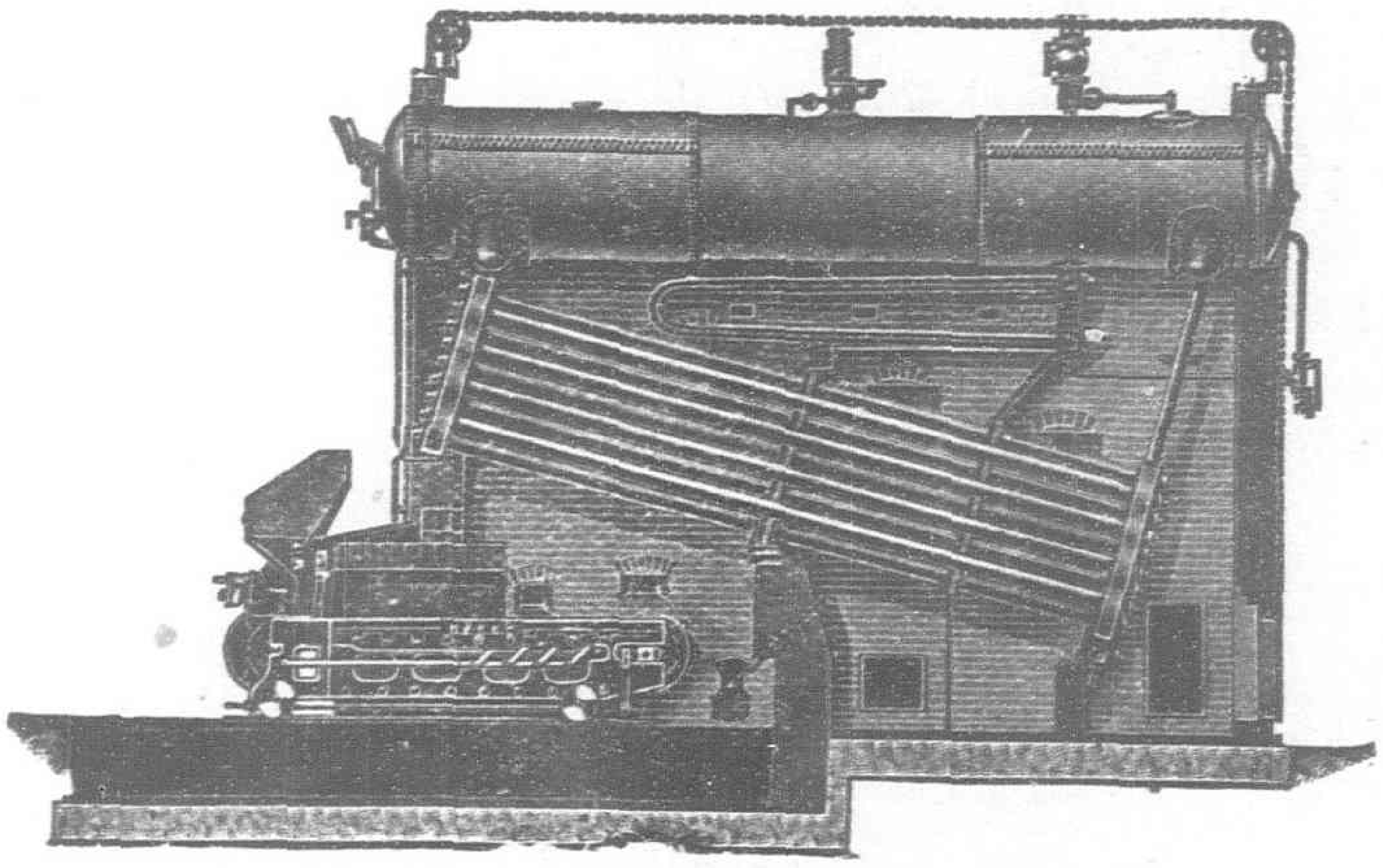

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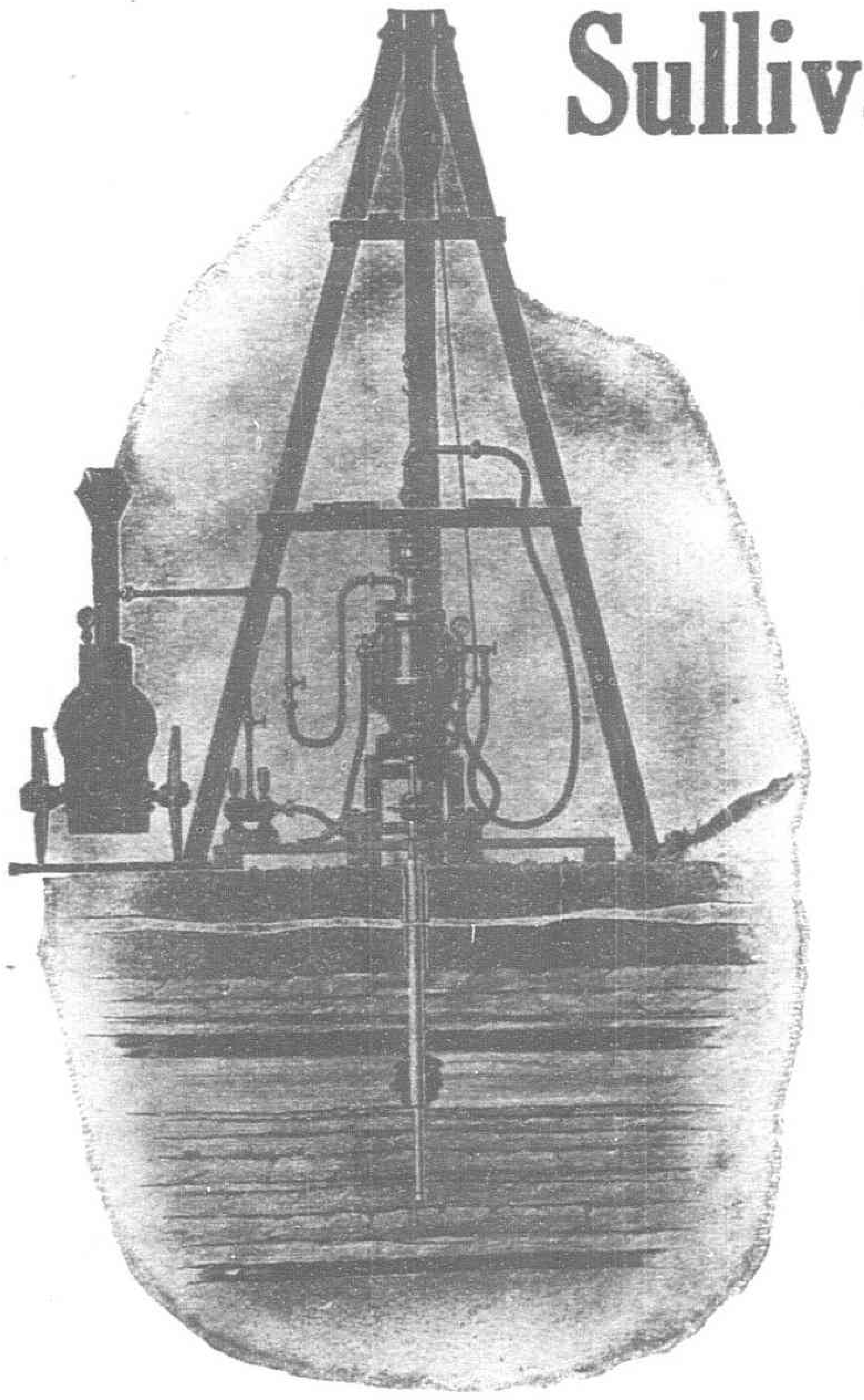

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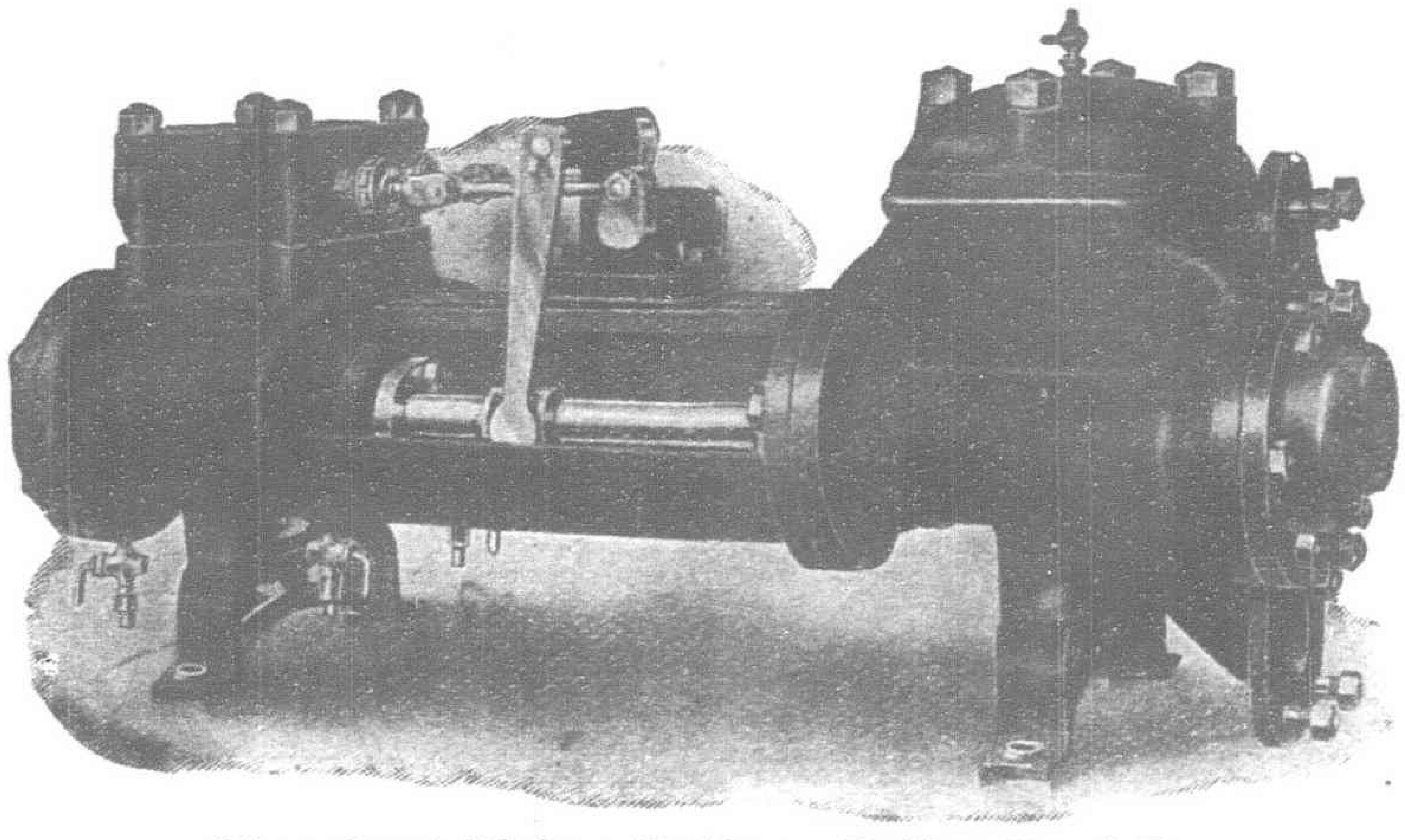

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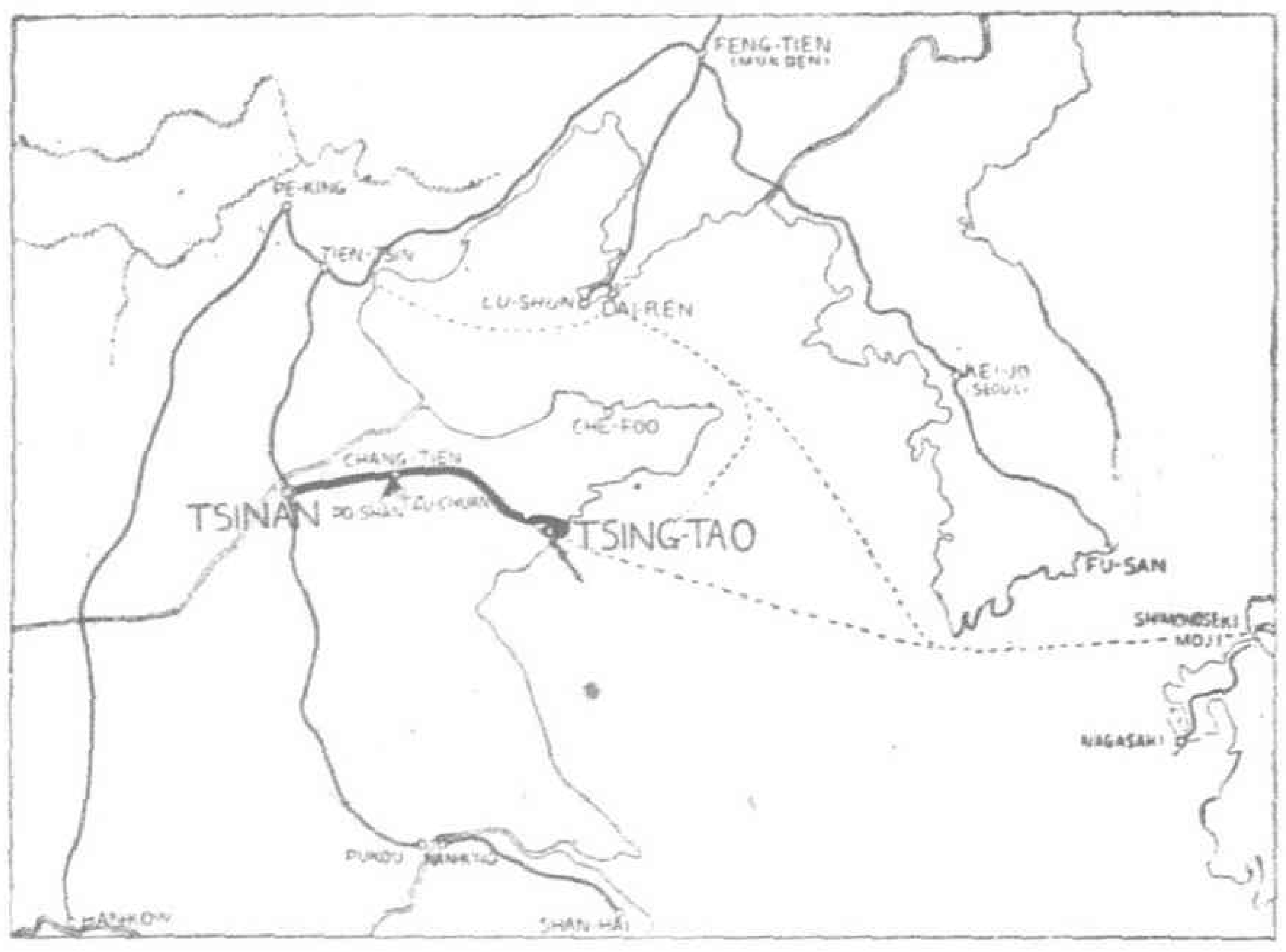

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Through passenger tickets are issued between the following principal stations of the Shantung Railway: Kiaochow, Kaomi, Fangtsu, Weihsien, Chingchow, Changtien, Chowtsun, Tsinan, Tzuchuan, Poshan, and the following points: In Manchuria—Port Arthur, Newchwang, Liaoyang, Fushun, Mukden, Tiehling, Kaiyuan, Changchun, Penchihu, Antung, Dairen; in Japan—Yokohama, Nagoya, Yokkaichi, Osaka, Kobe, Ujina, Moji, Shimonoseki and Shanghai.

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Collieries—The Tzuchuan (Shisen) and Fangtzu (Boshi) collieries are managed by the Mining Department of the Shantung Railway.

At present the daily output of Tzuchuan coal is about 1,500 tons, far surpassing the amount taken out when the Germans were in control. The coal is well-known for its good quality and fair price.

Tsinan—Tsinan, the Capital of Shantung, is the western terminus of the Shantung Railway, and also one of the most important stations on the Tientsin-Pukow Railway.

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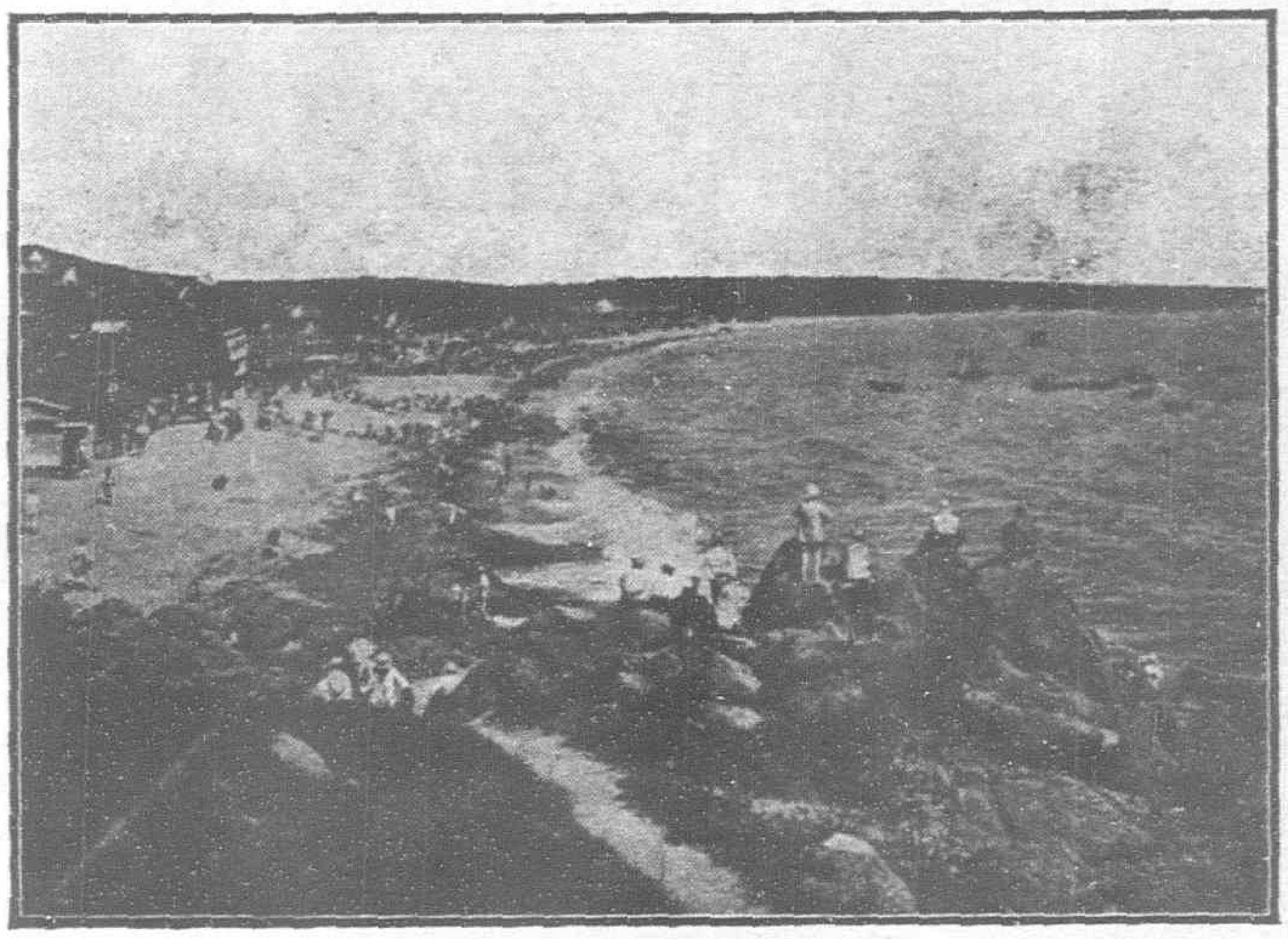
Connections at Tsinan—By Tientsin-Pukow Line with Tientsin, 7.56 a.m. daily, and with Pukow, 8.21 p.m. daily.



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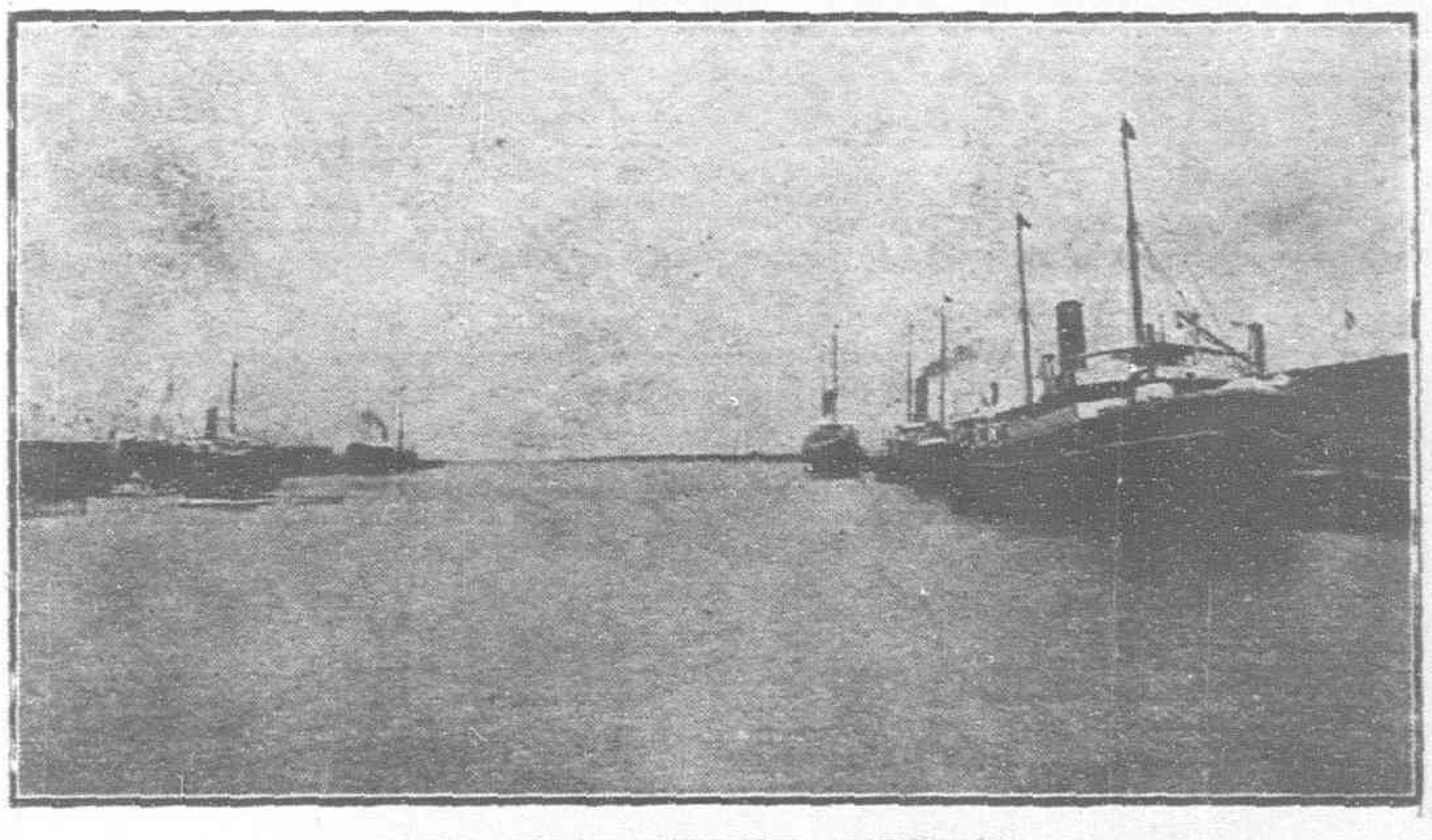

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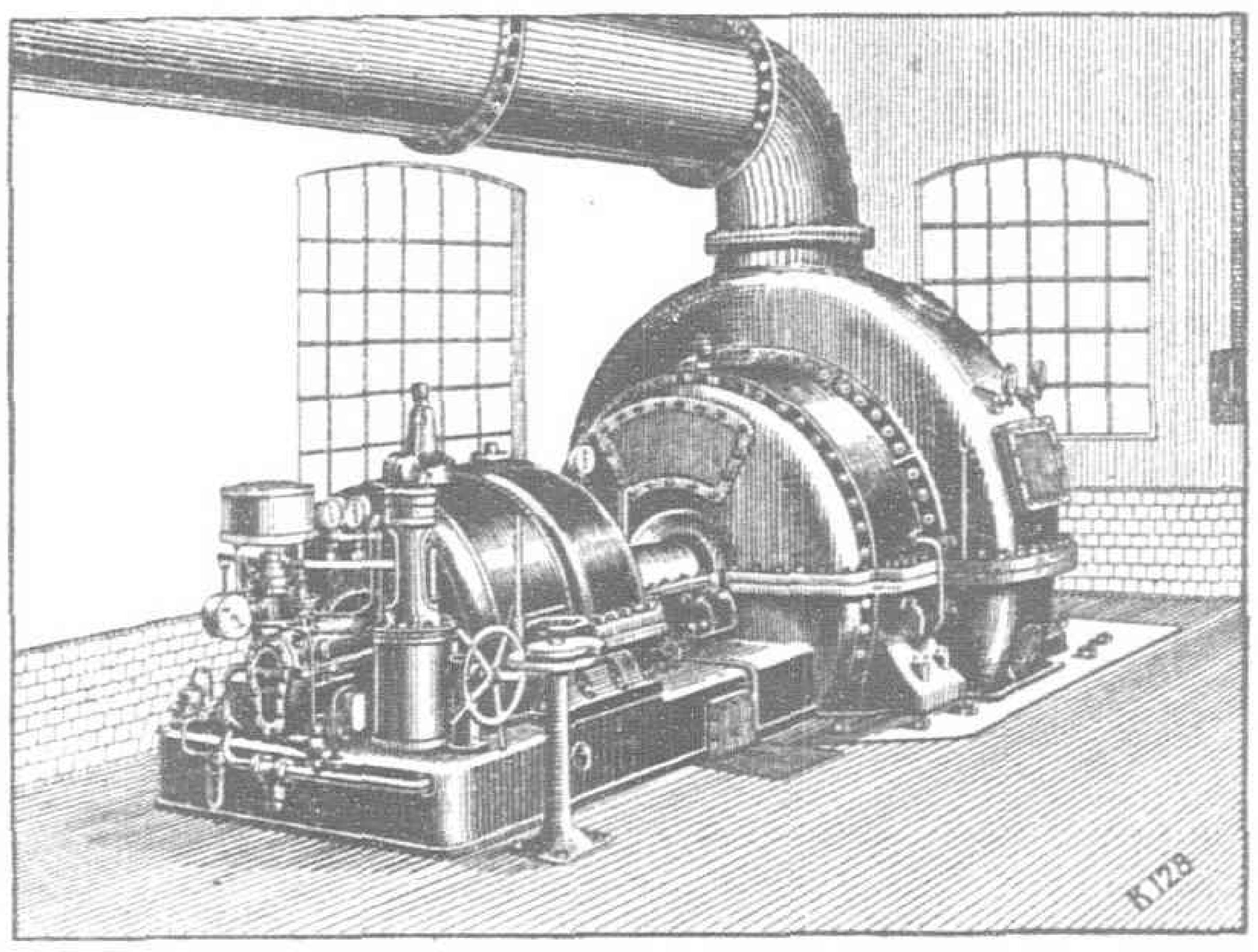

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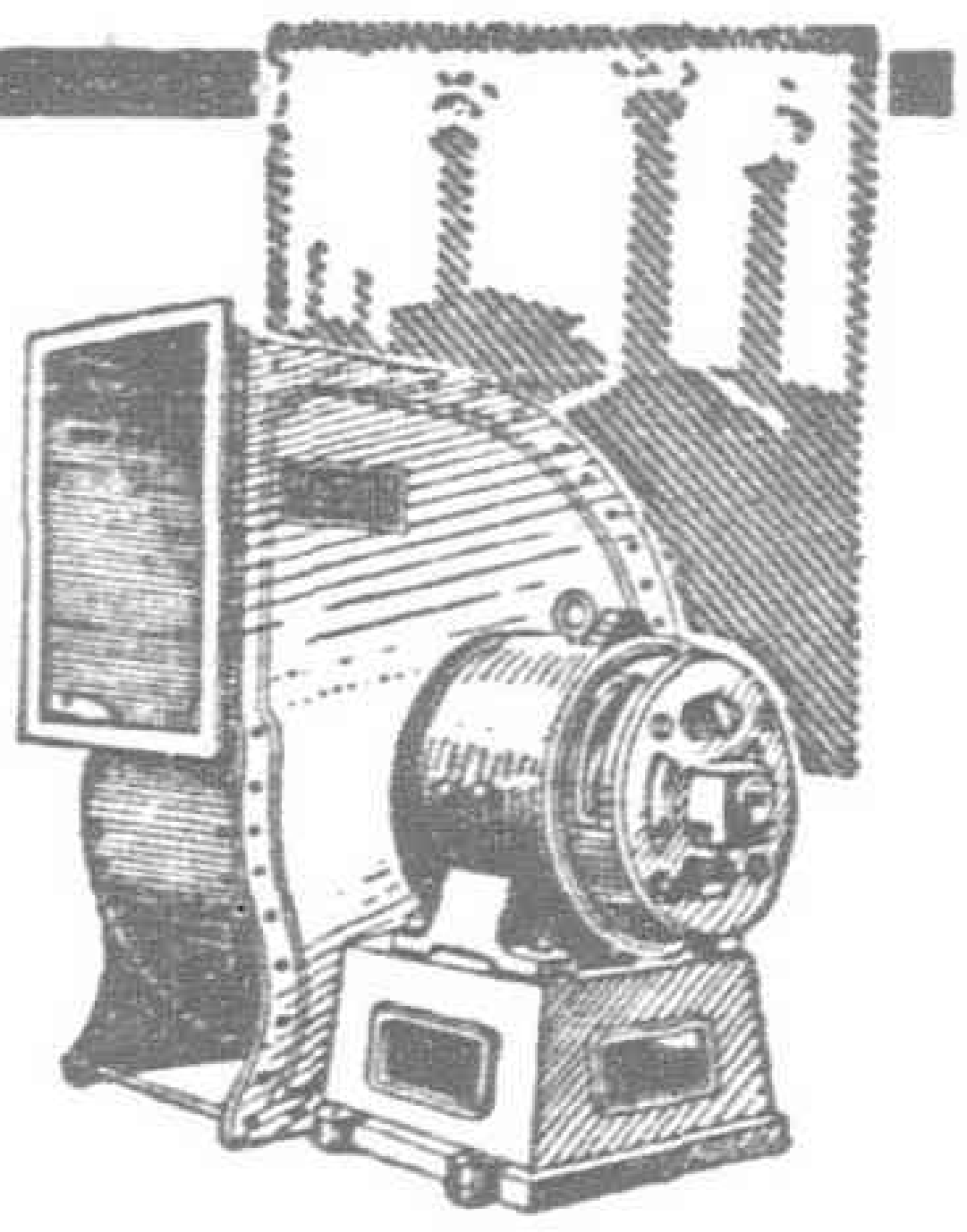

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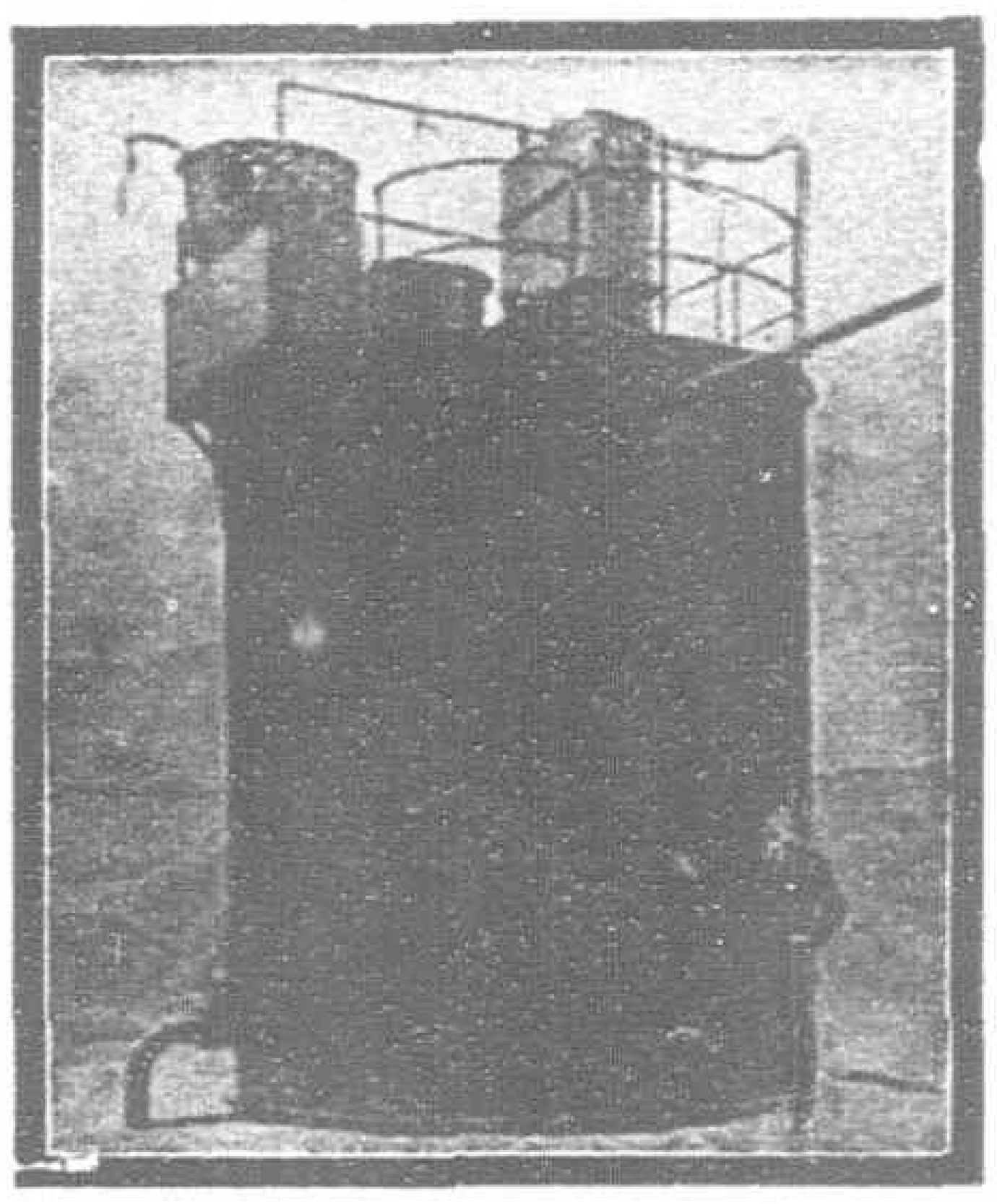

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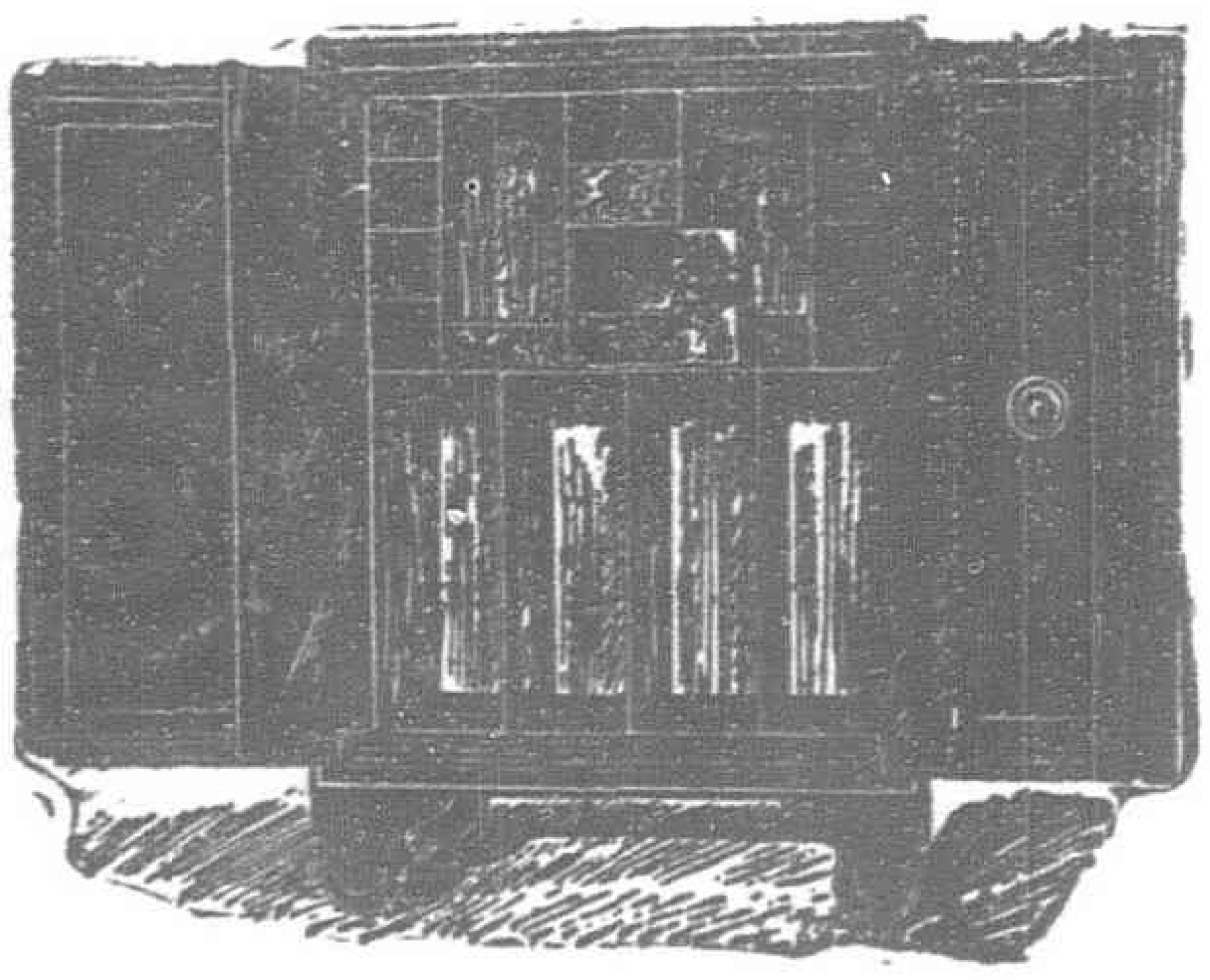

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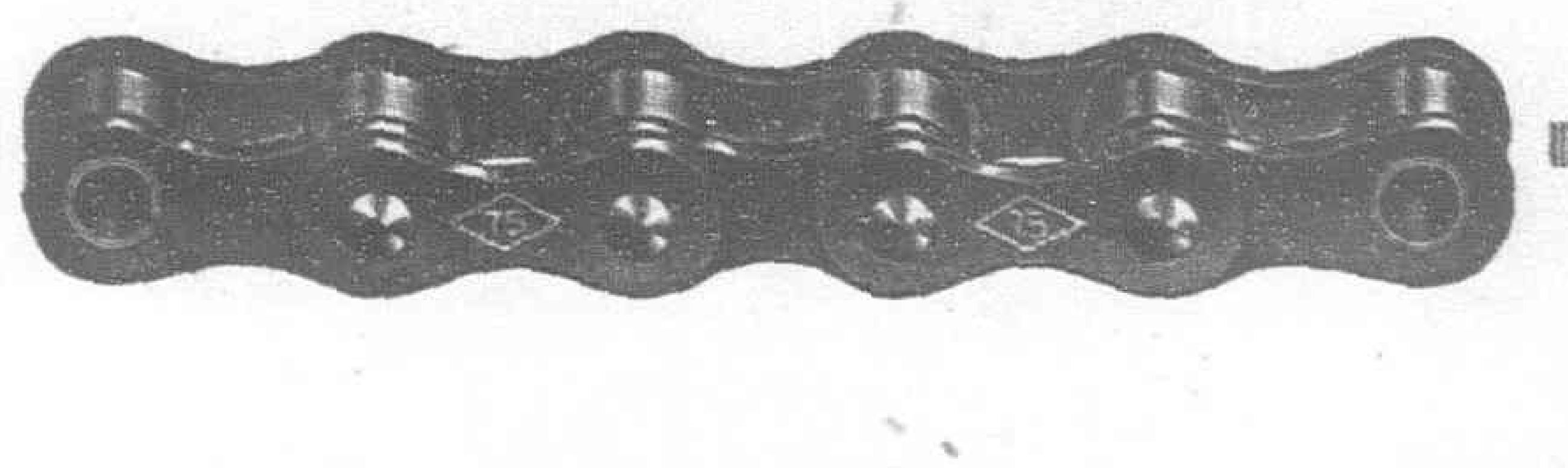

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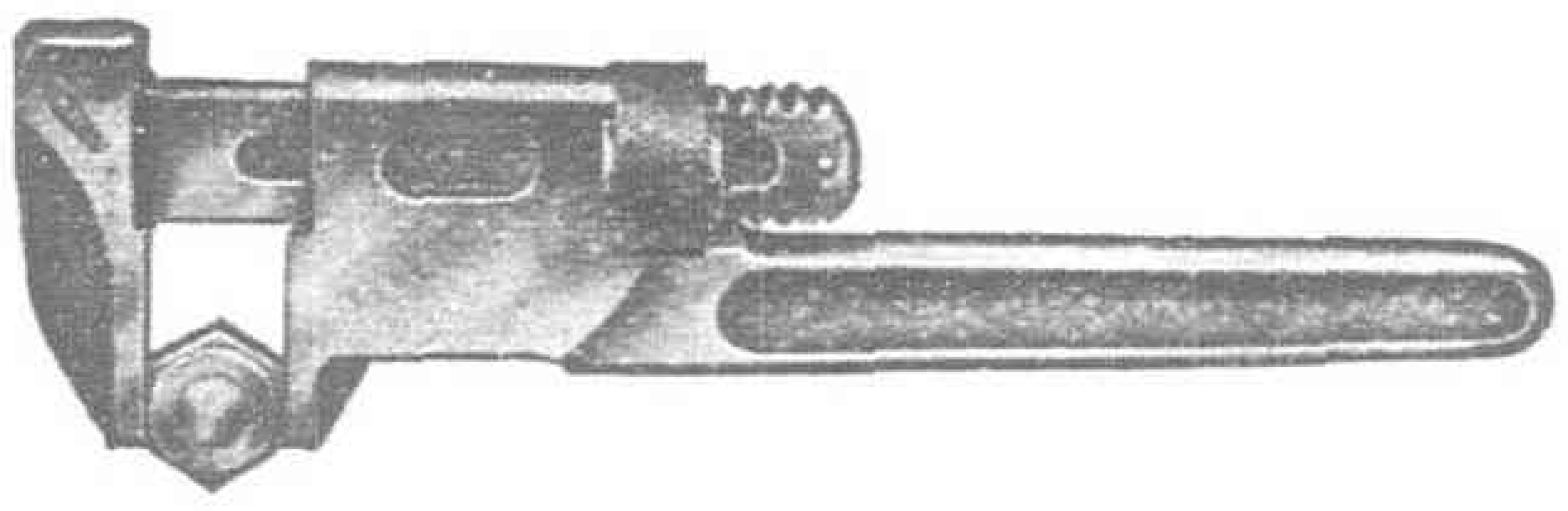

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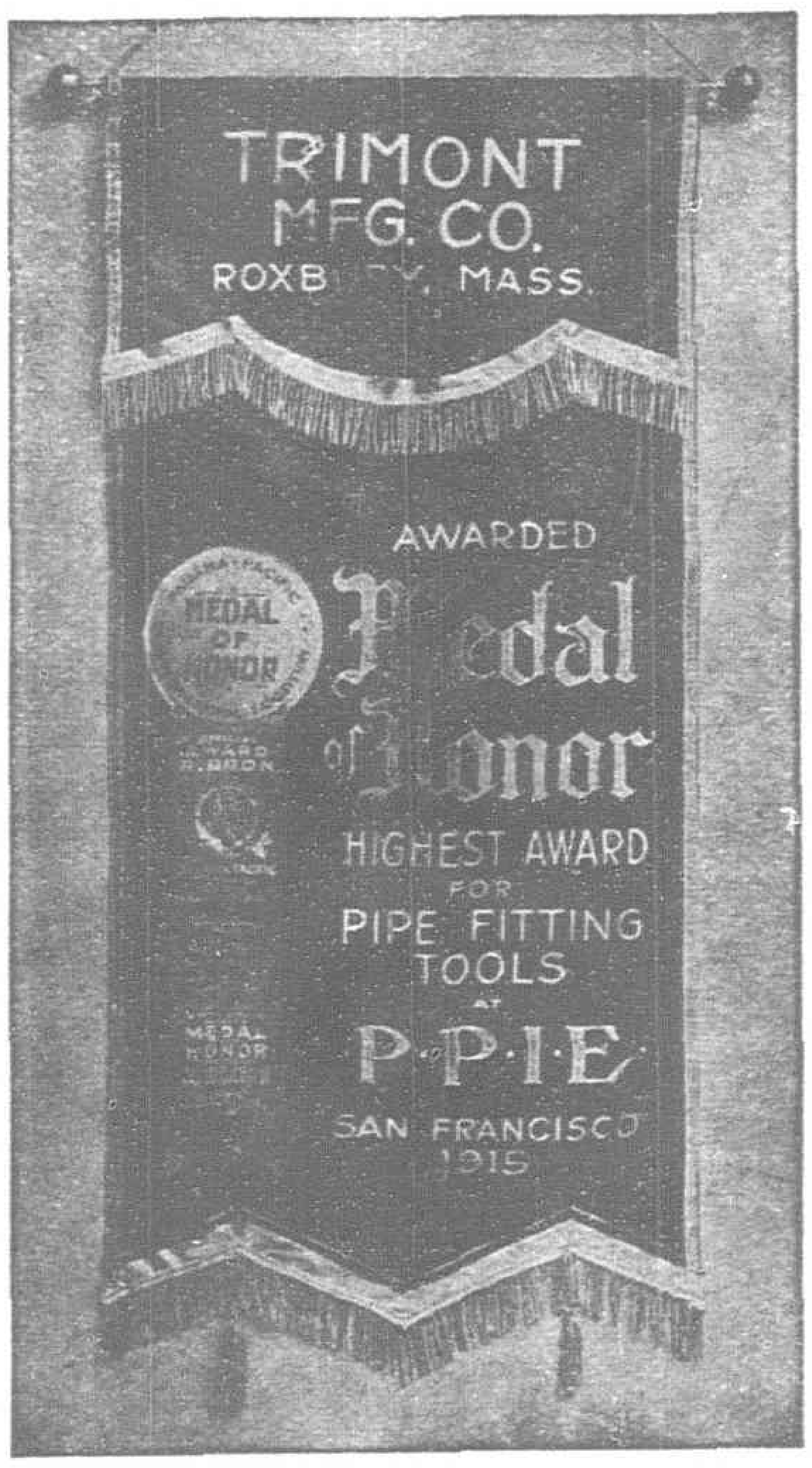

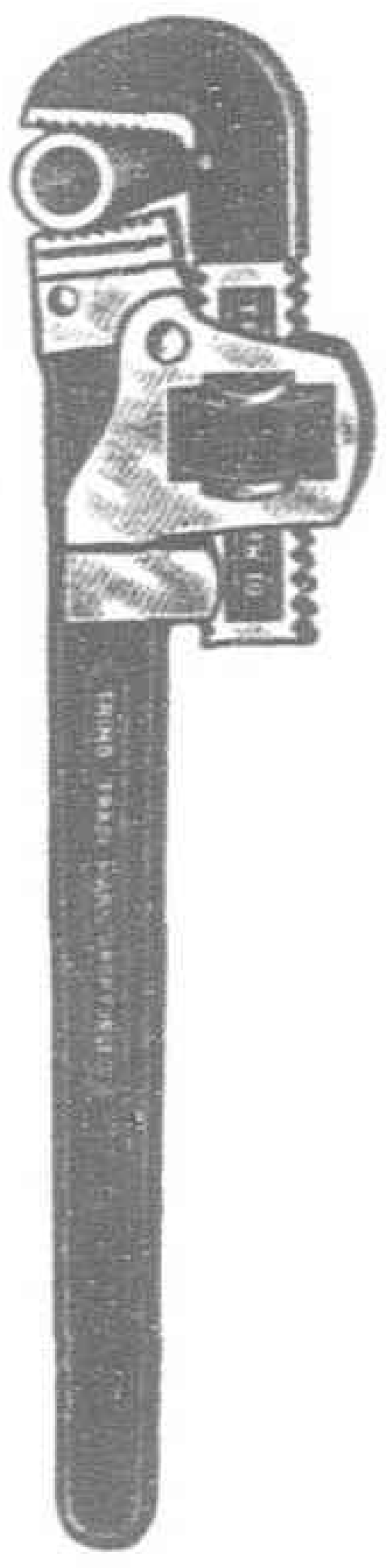

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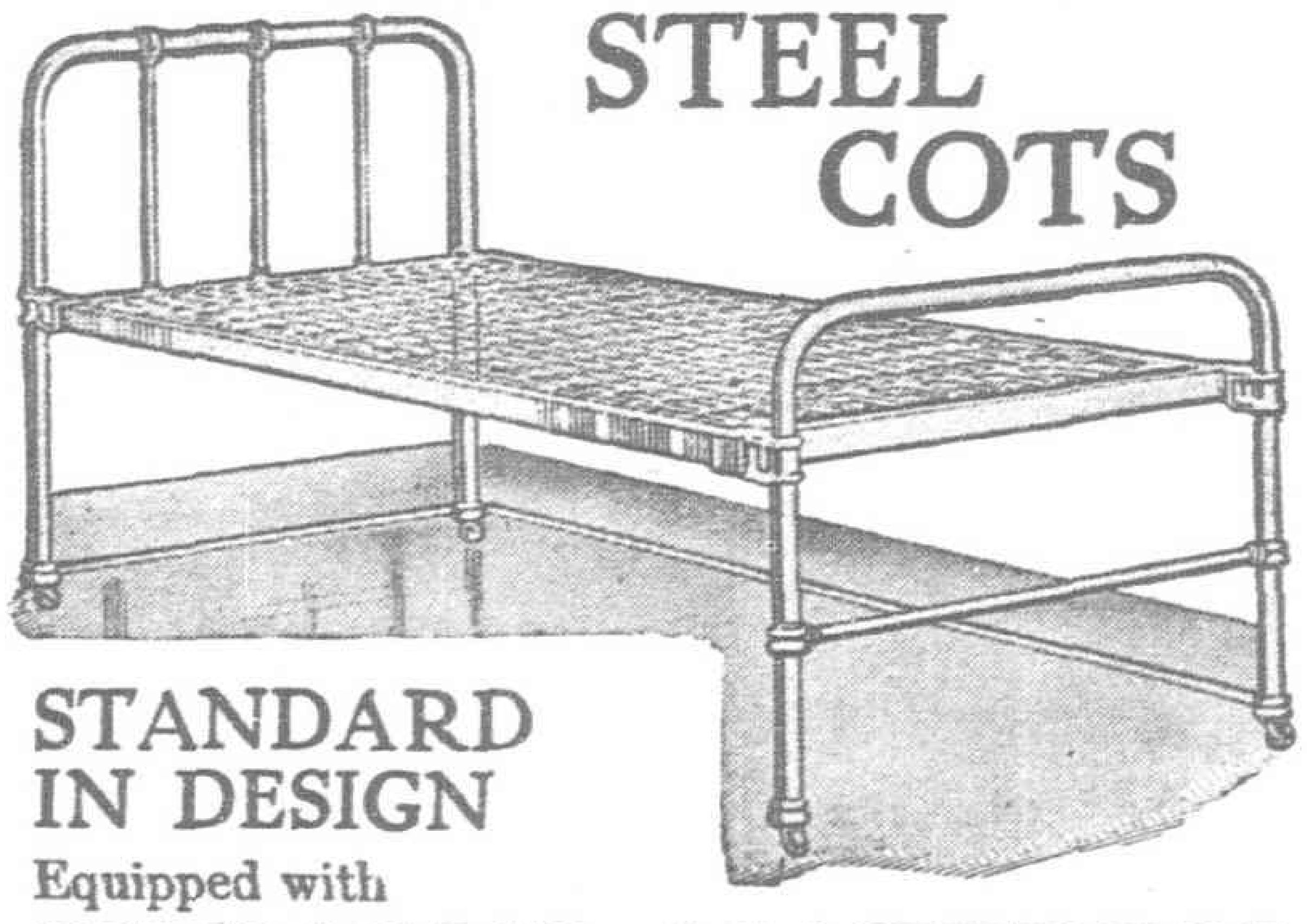

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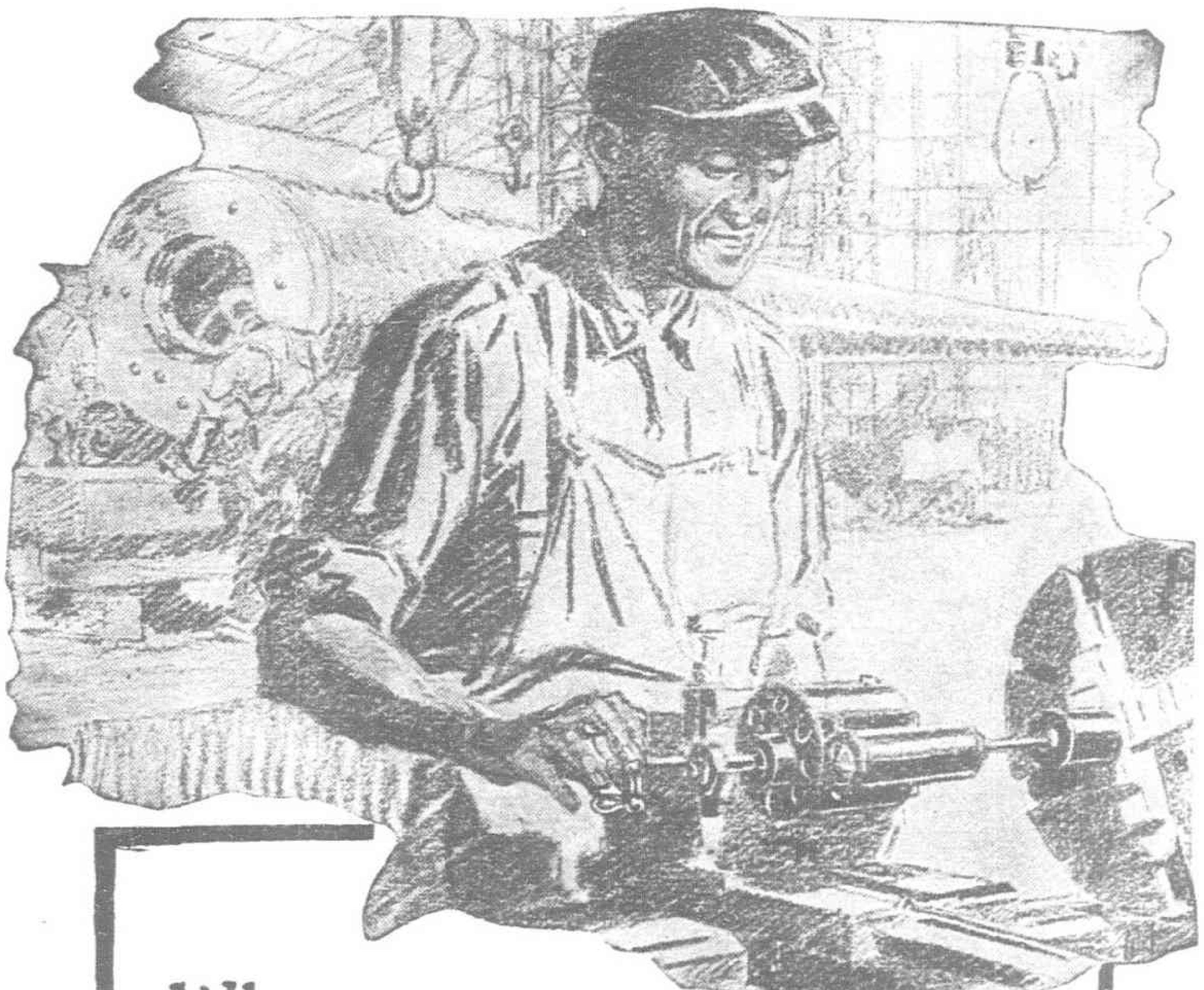

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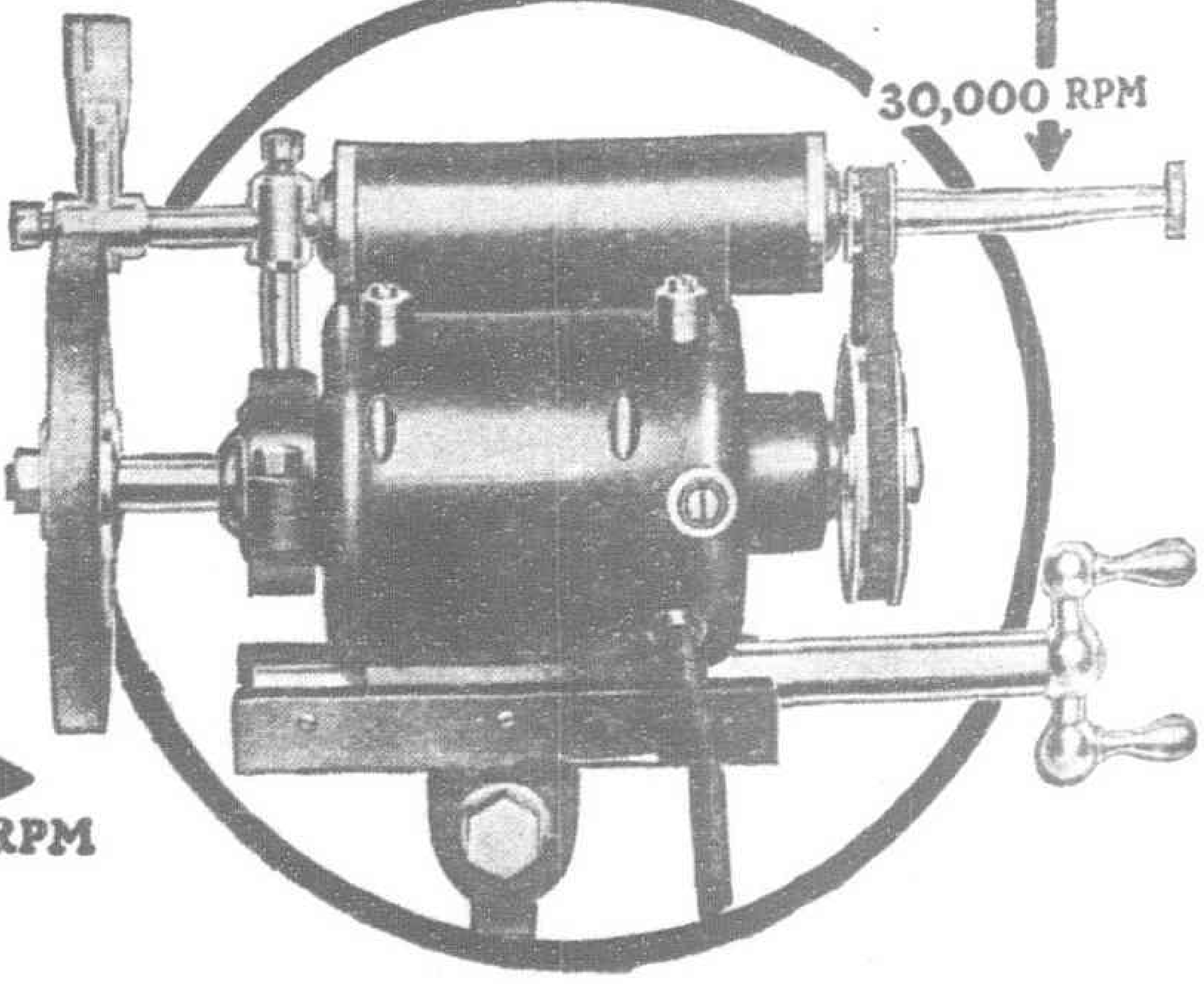

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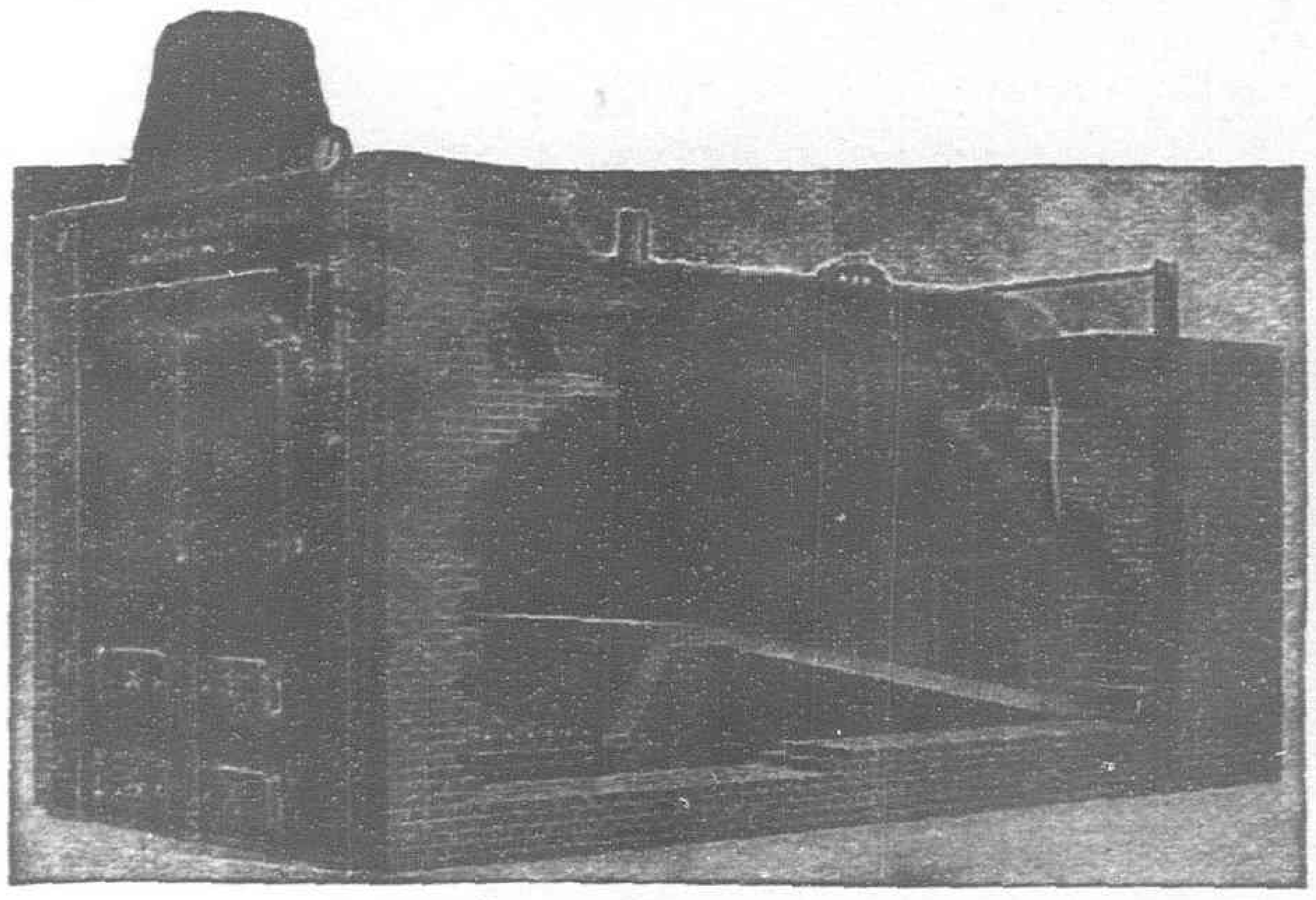

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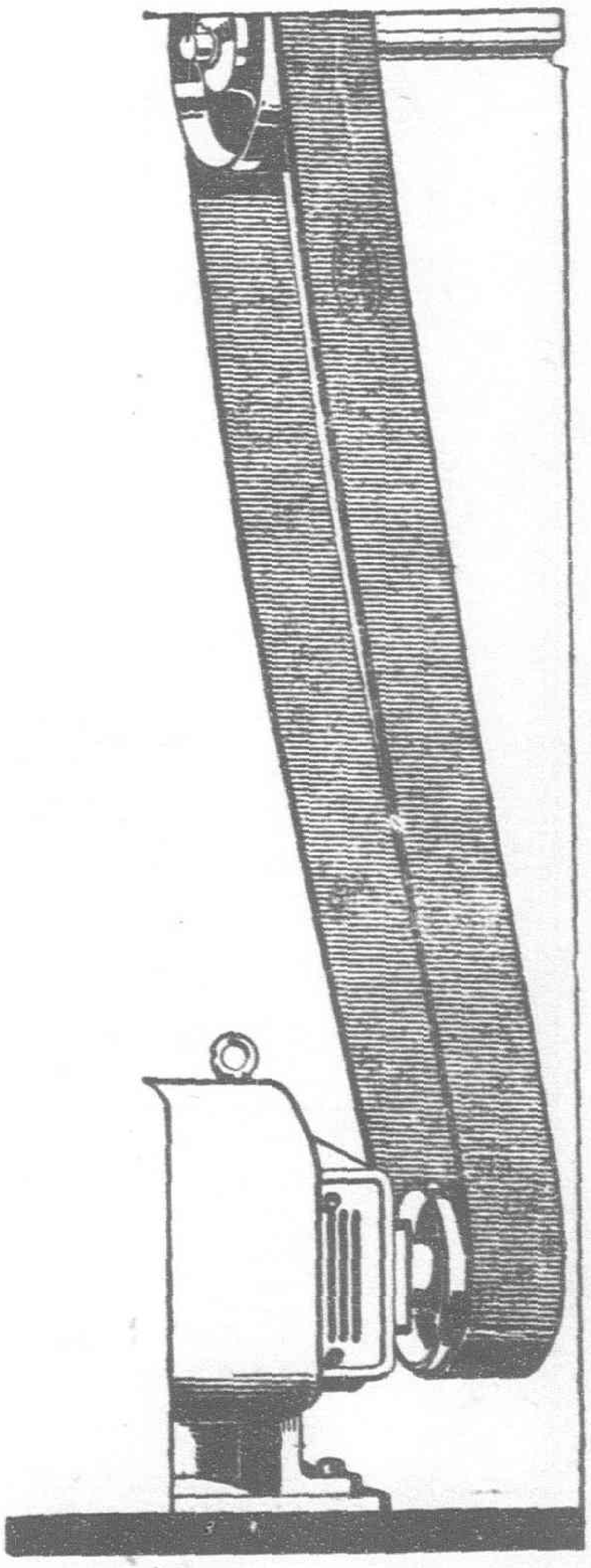

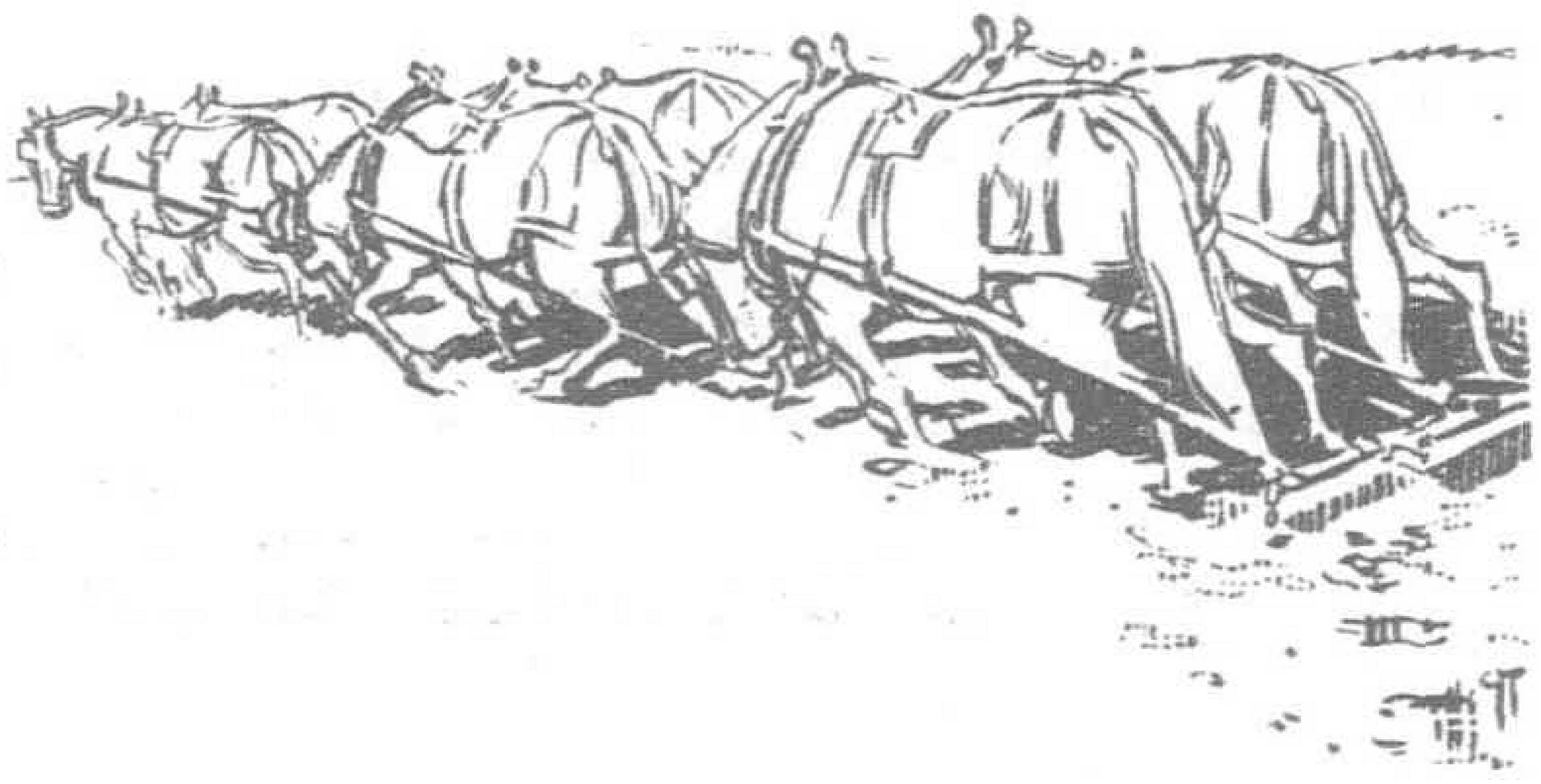

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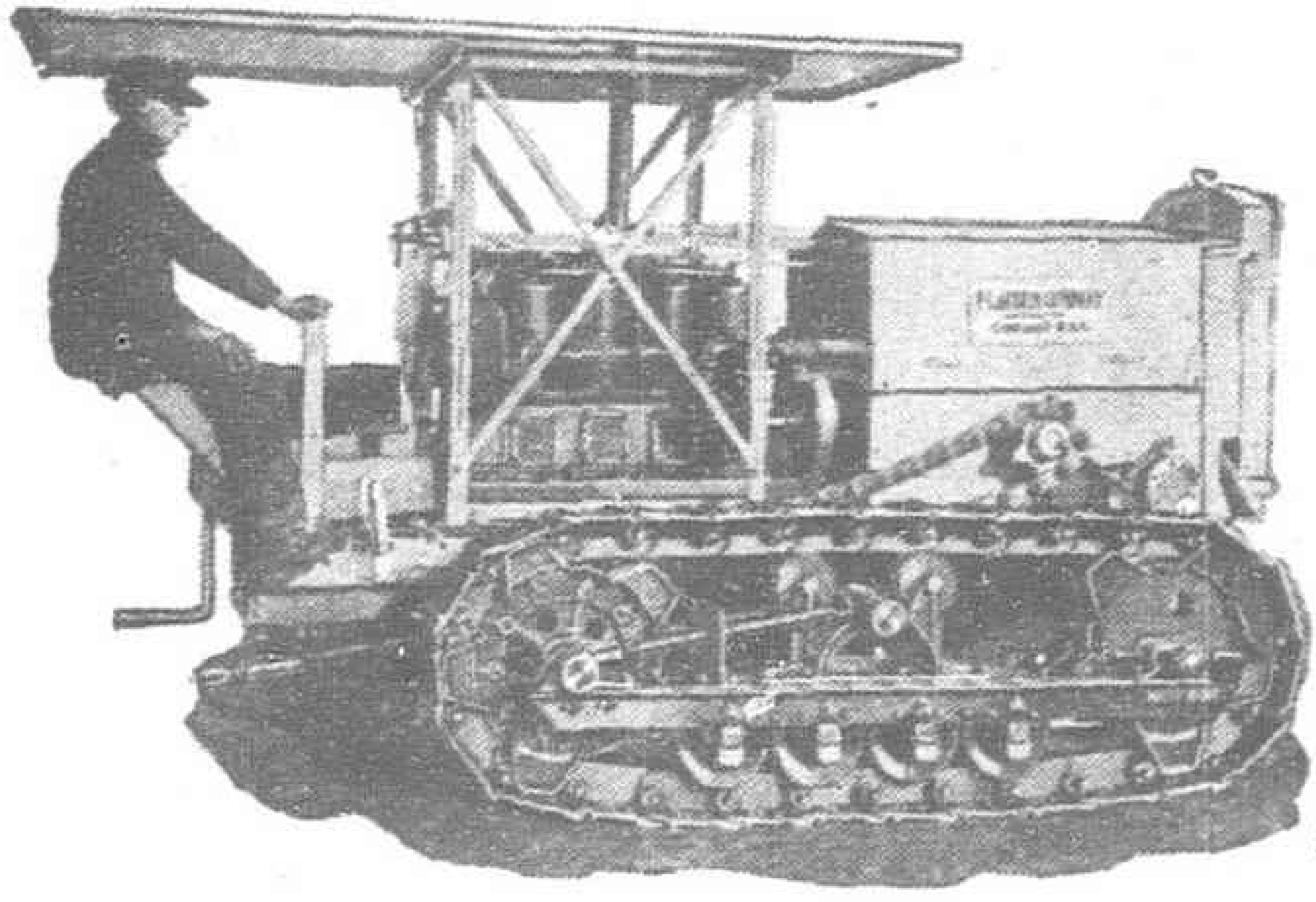

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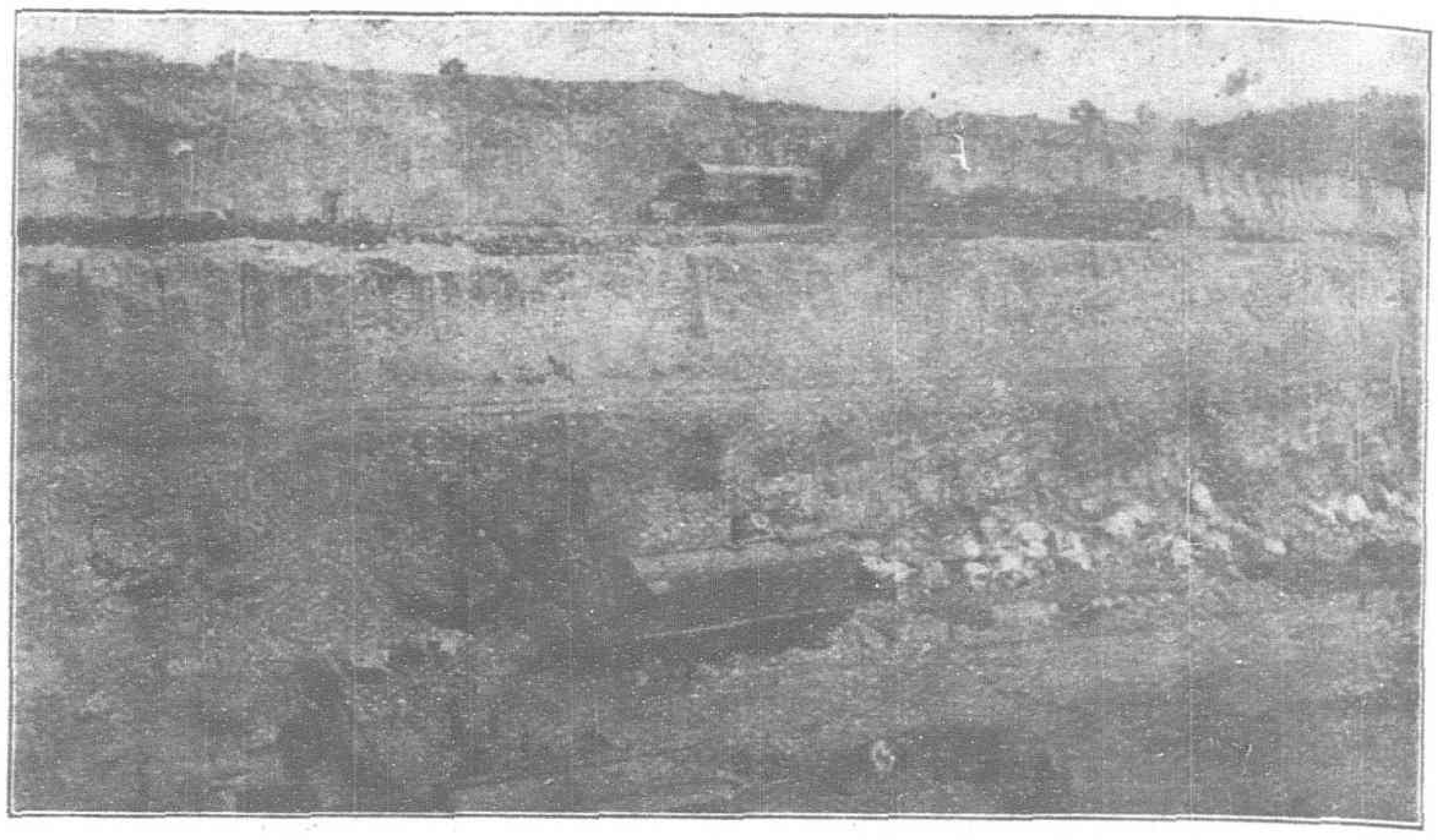

68-C Bucyrus steam shovels at work on copper deposits of the Union Miniere Du Haut Katanga, Africa

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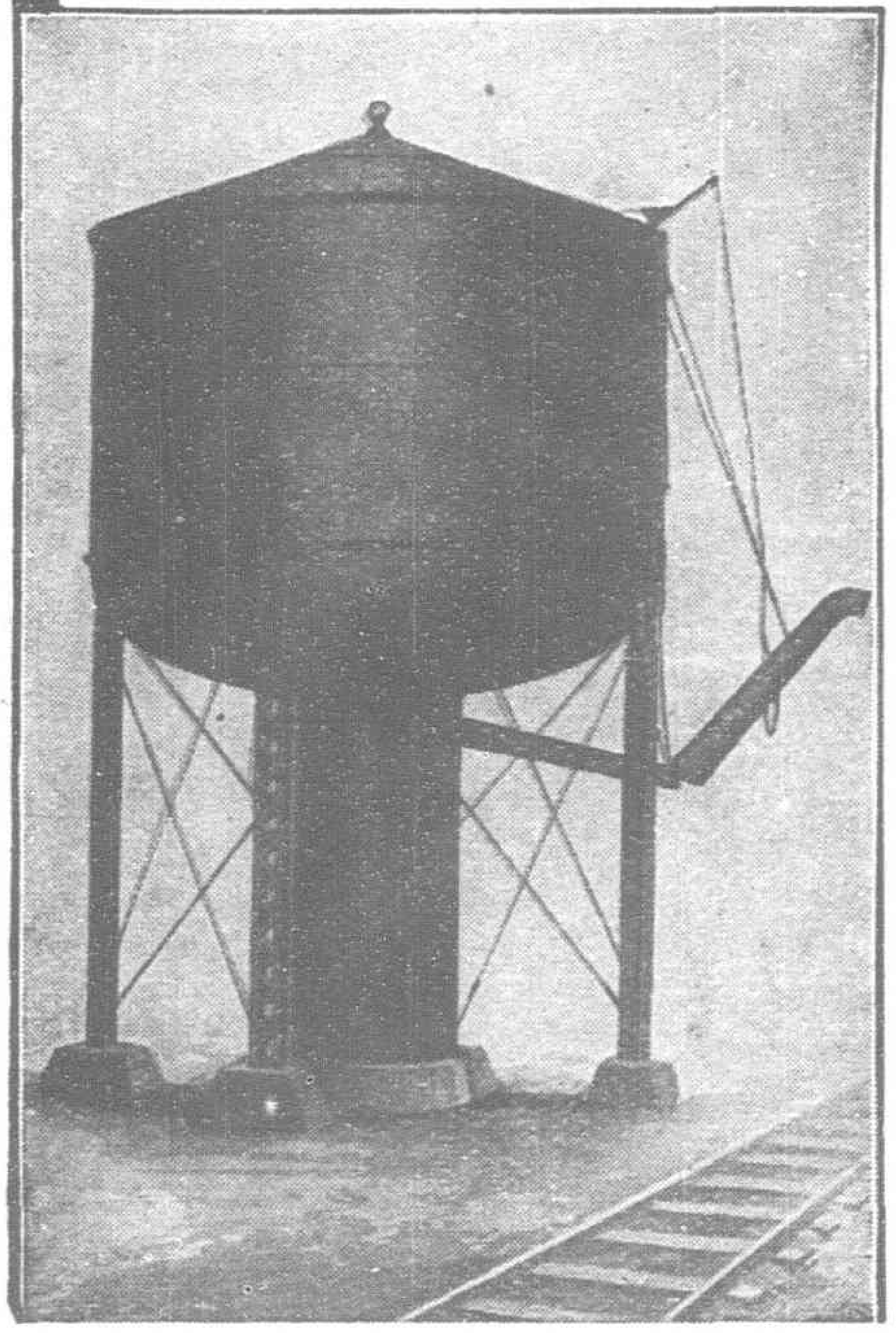

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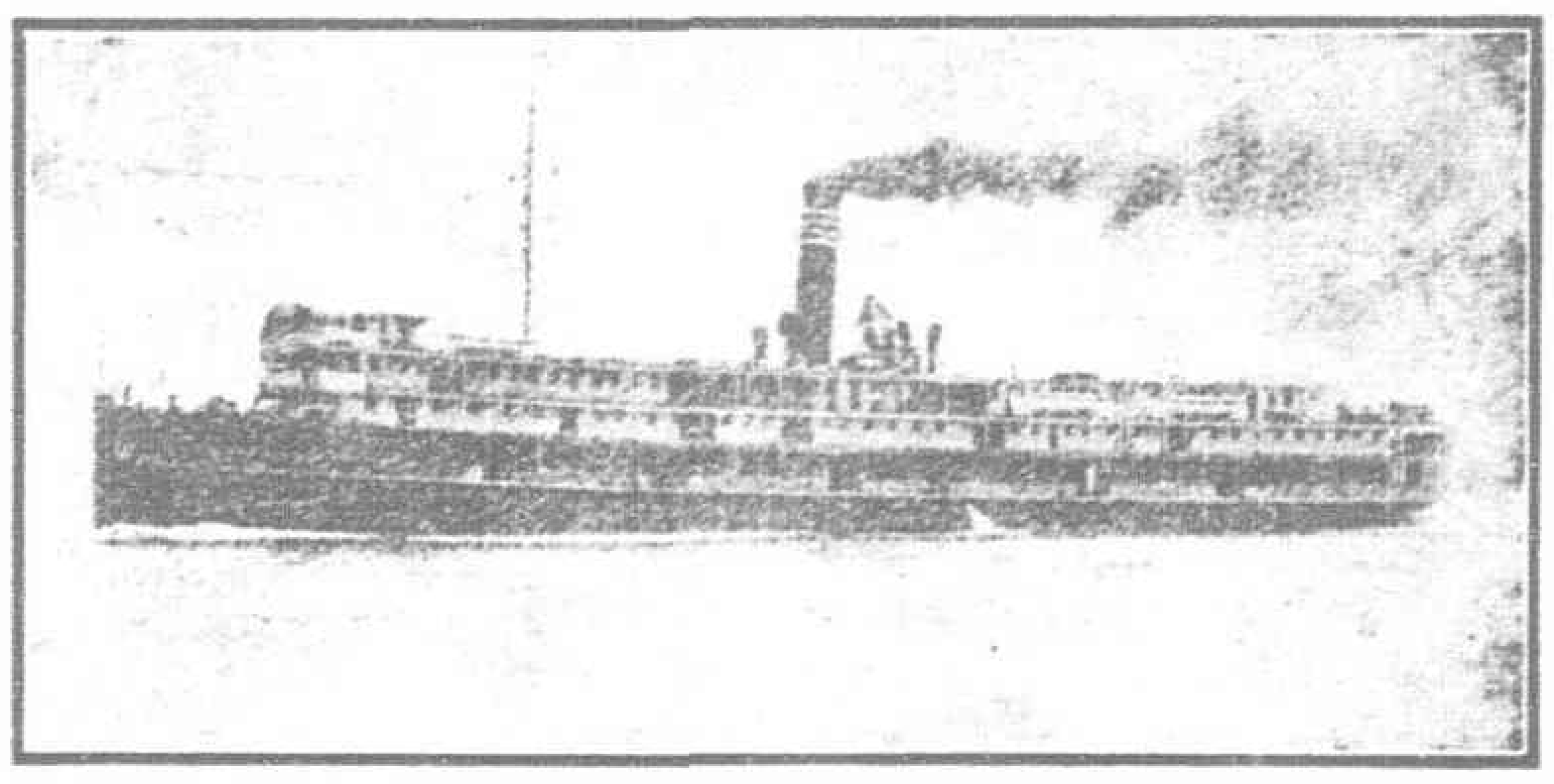

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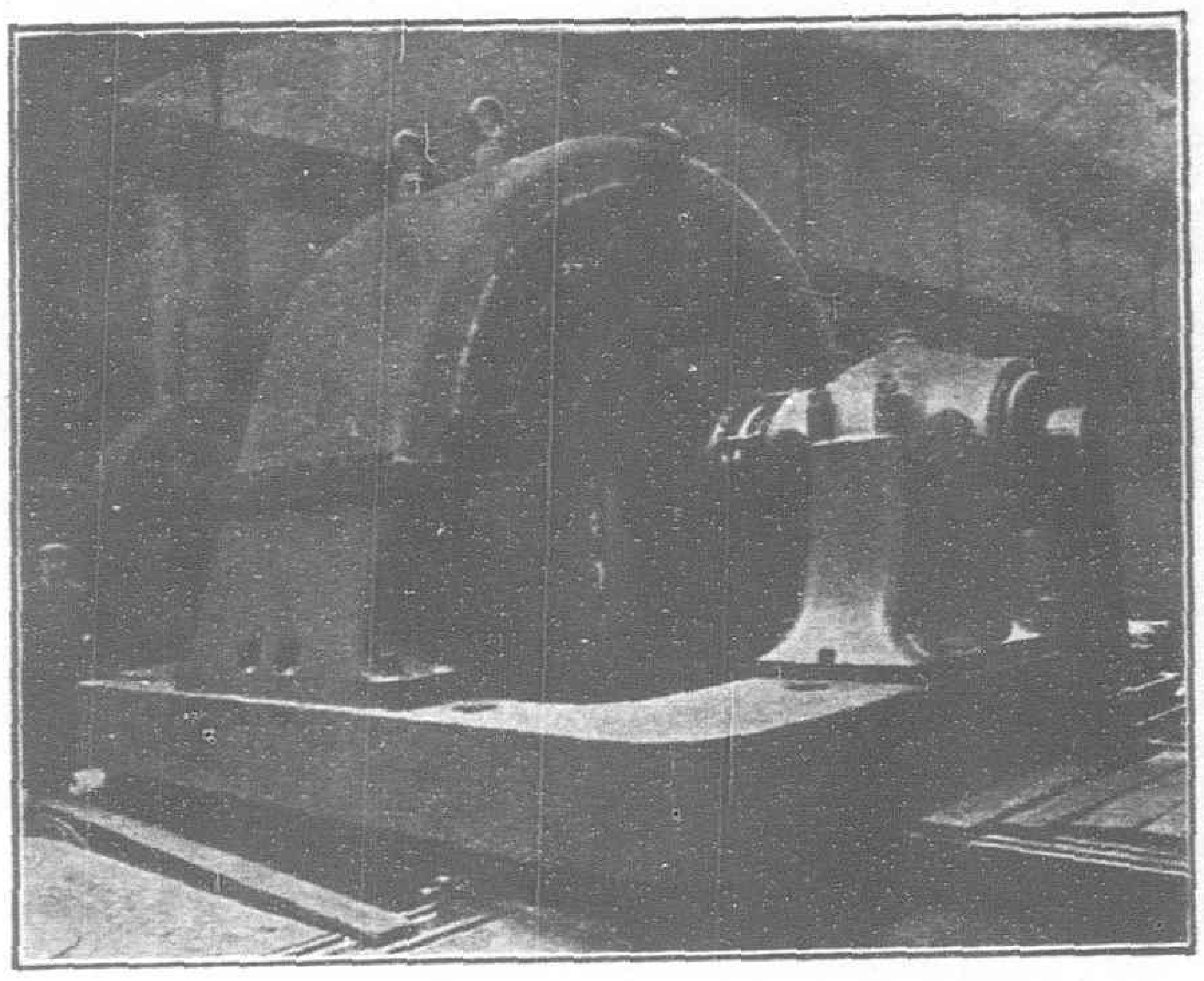

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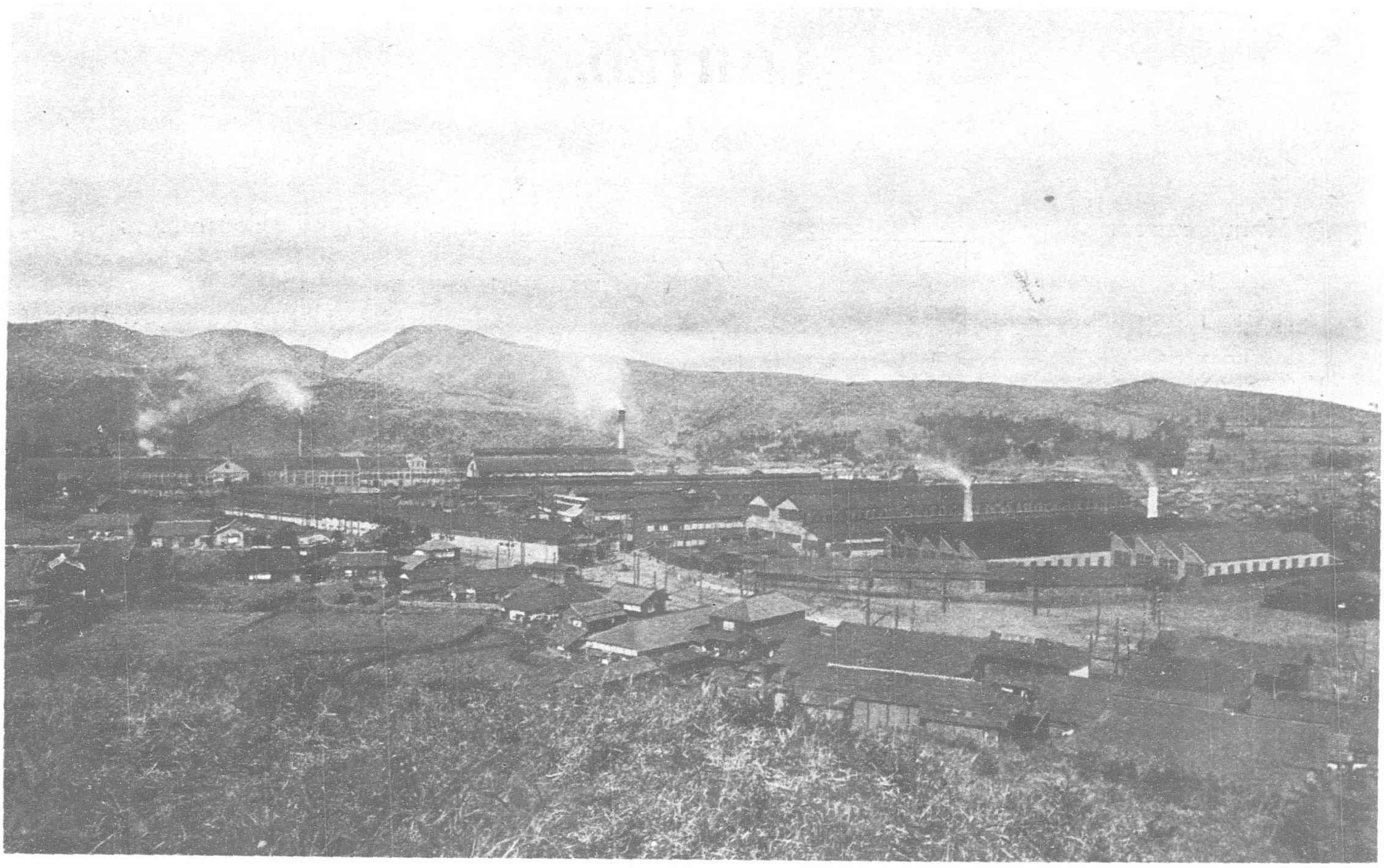

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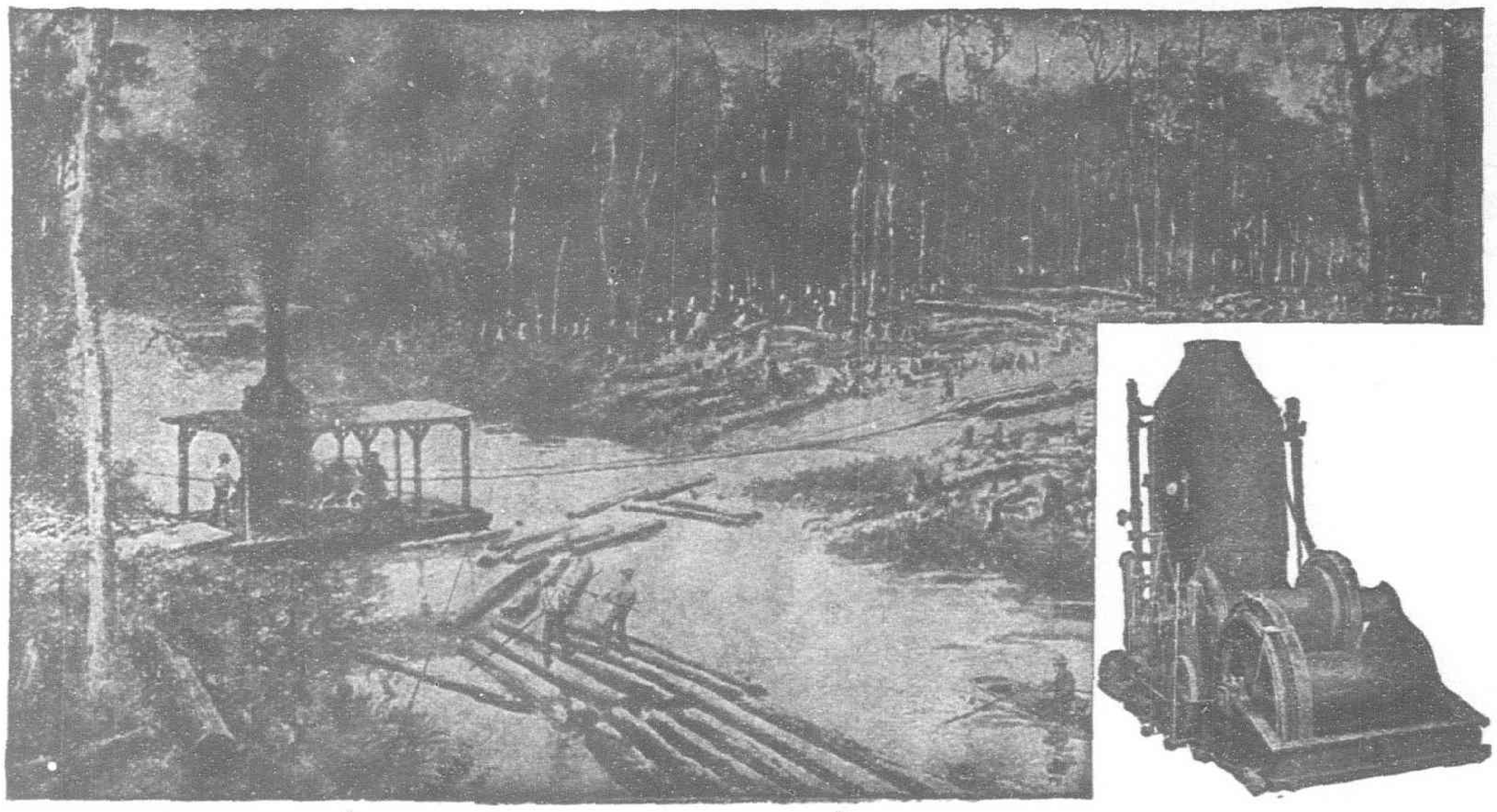

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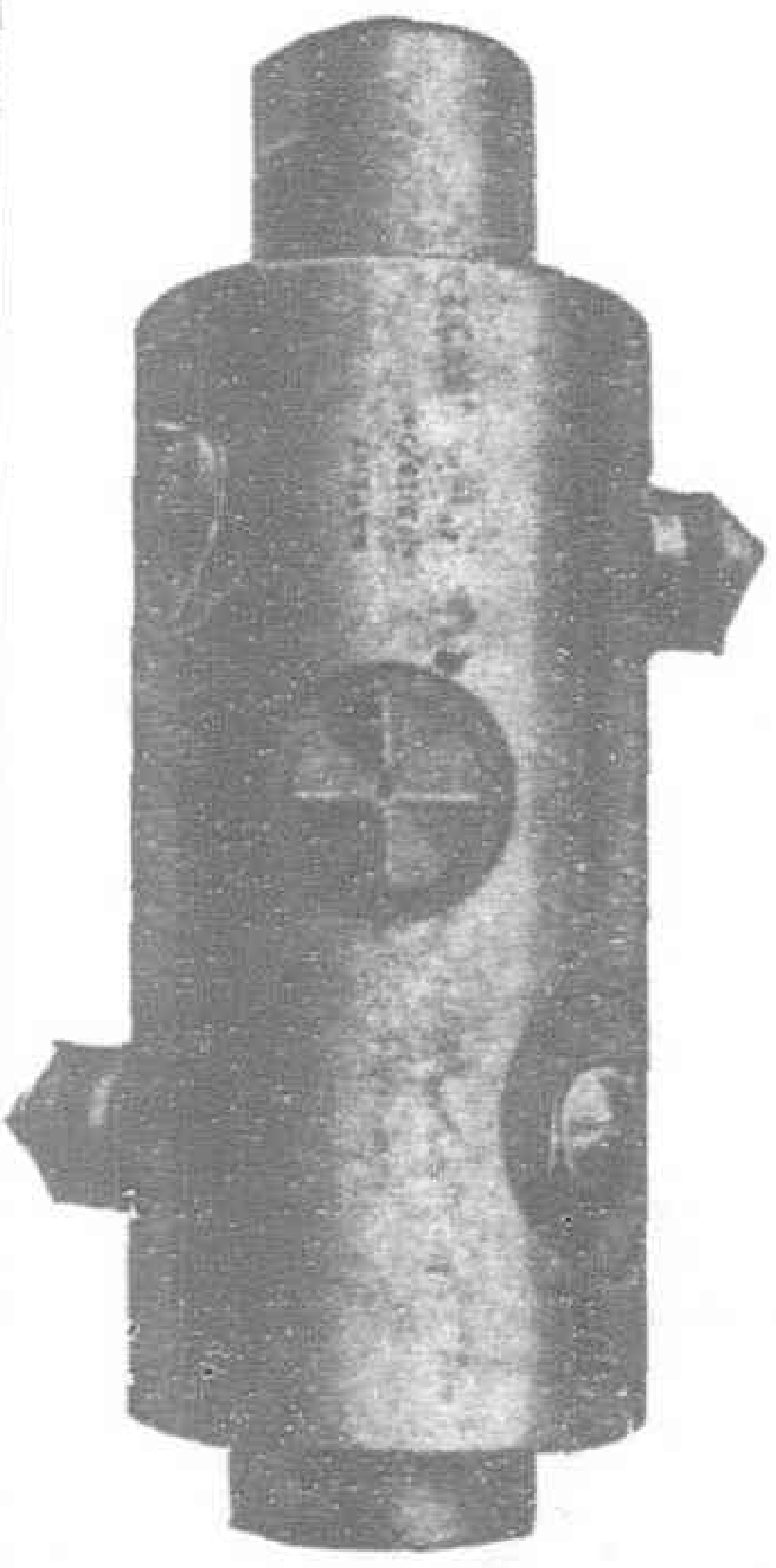

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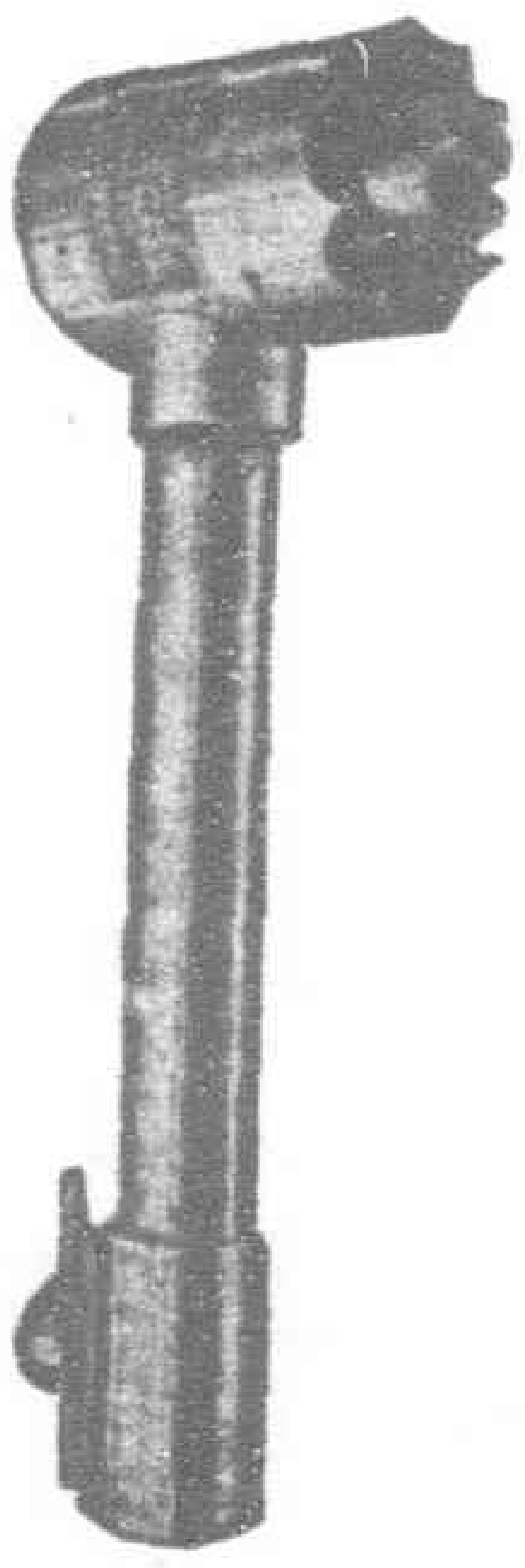

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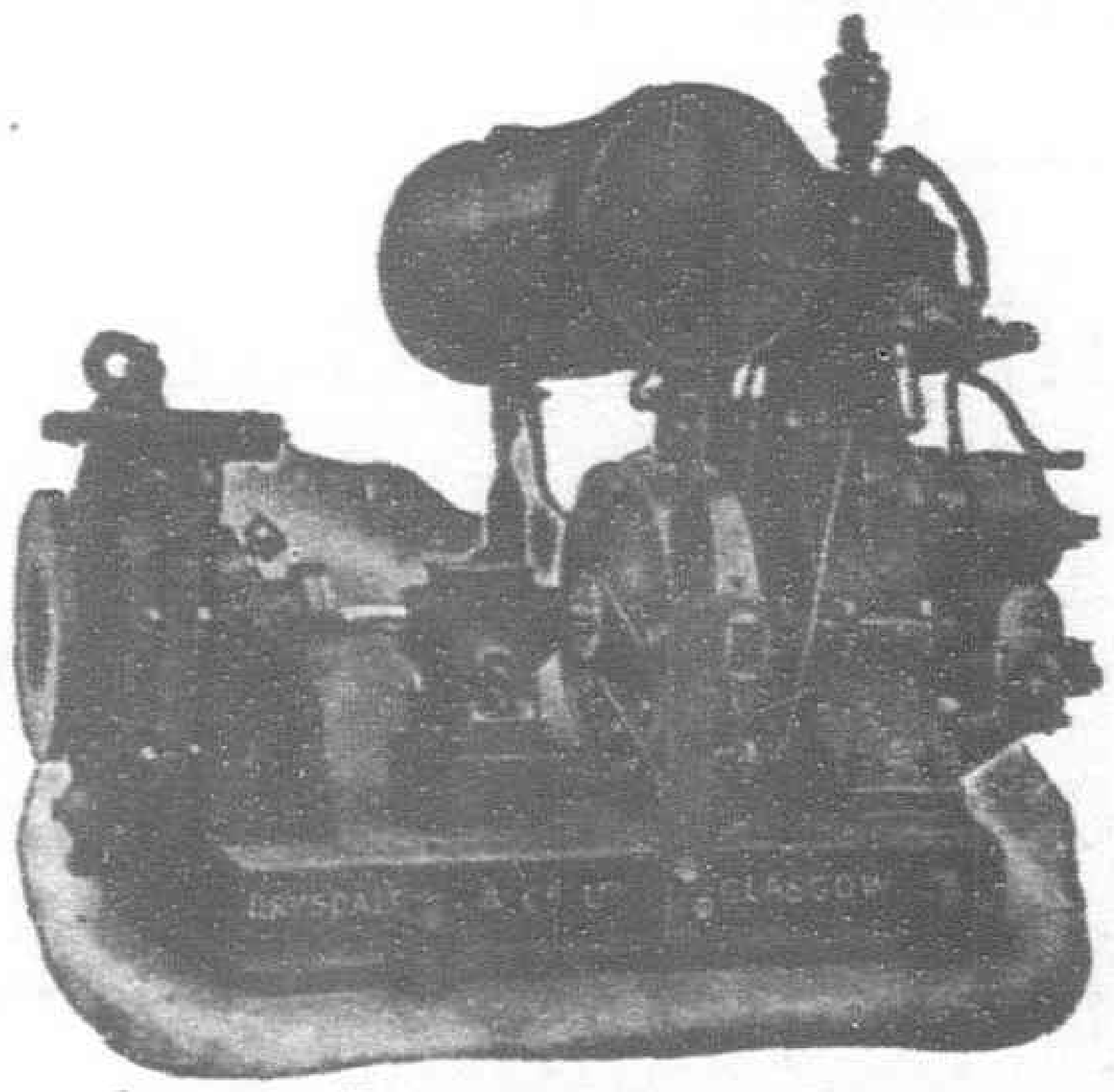

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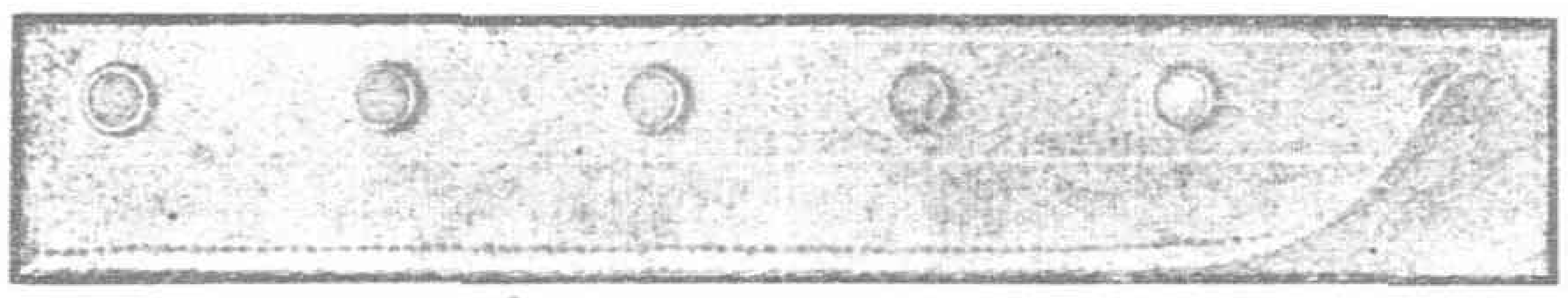

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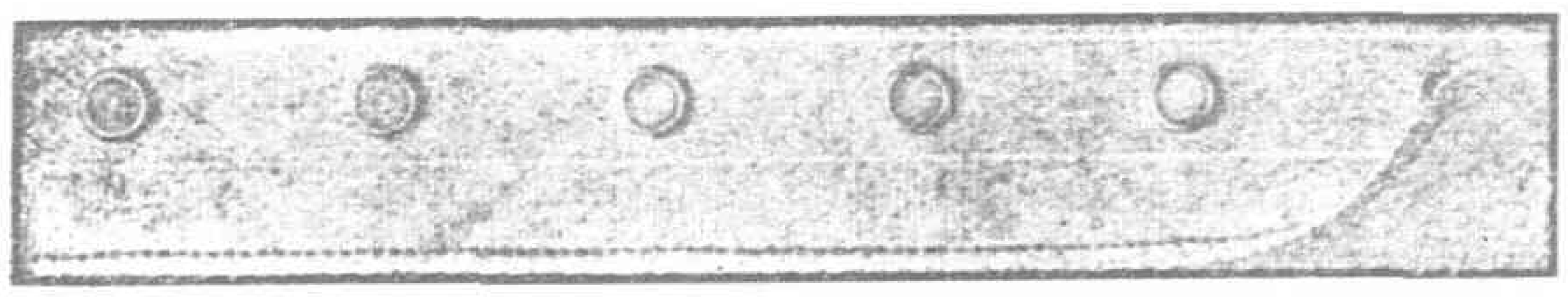

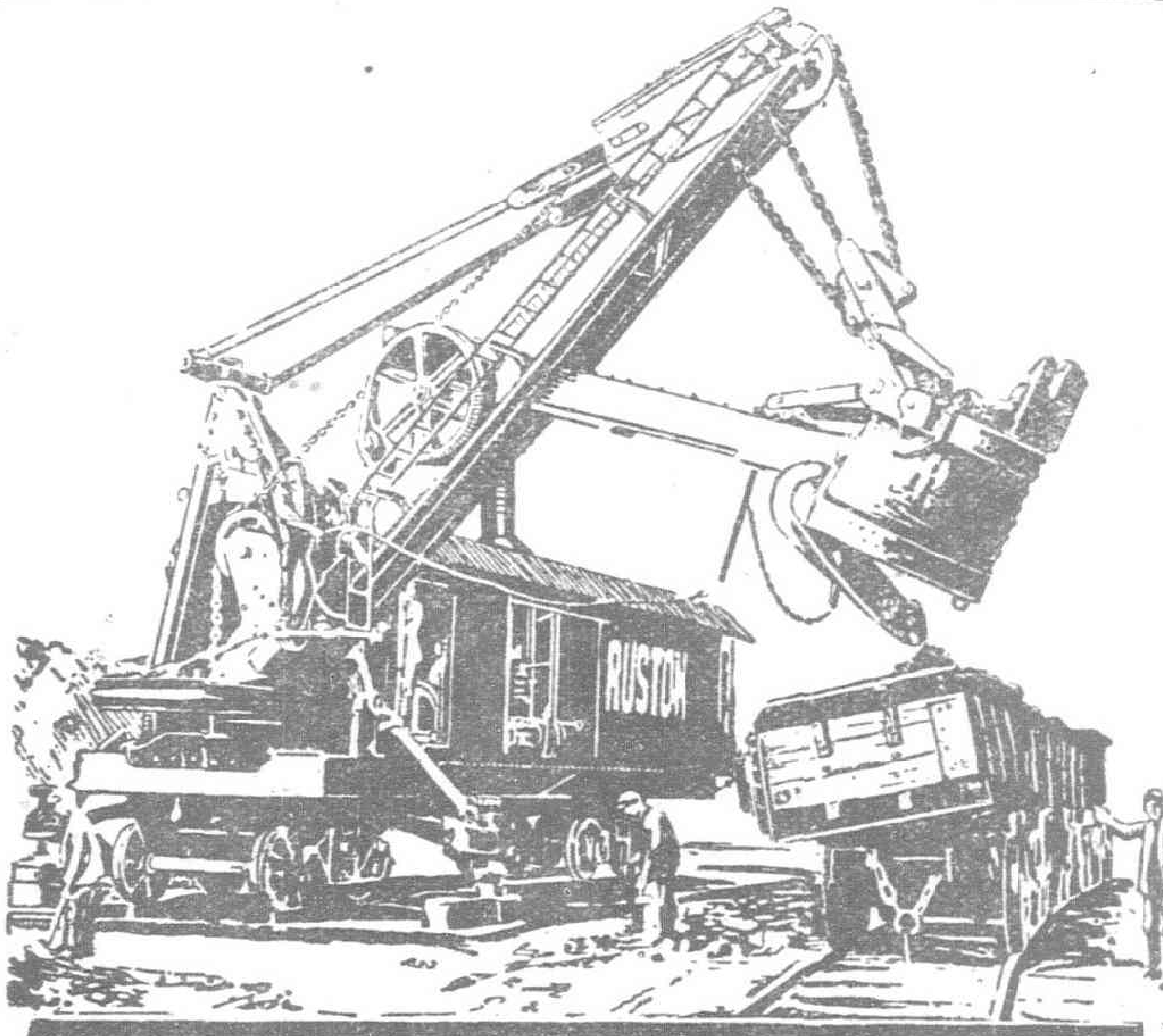

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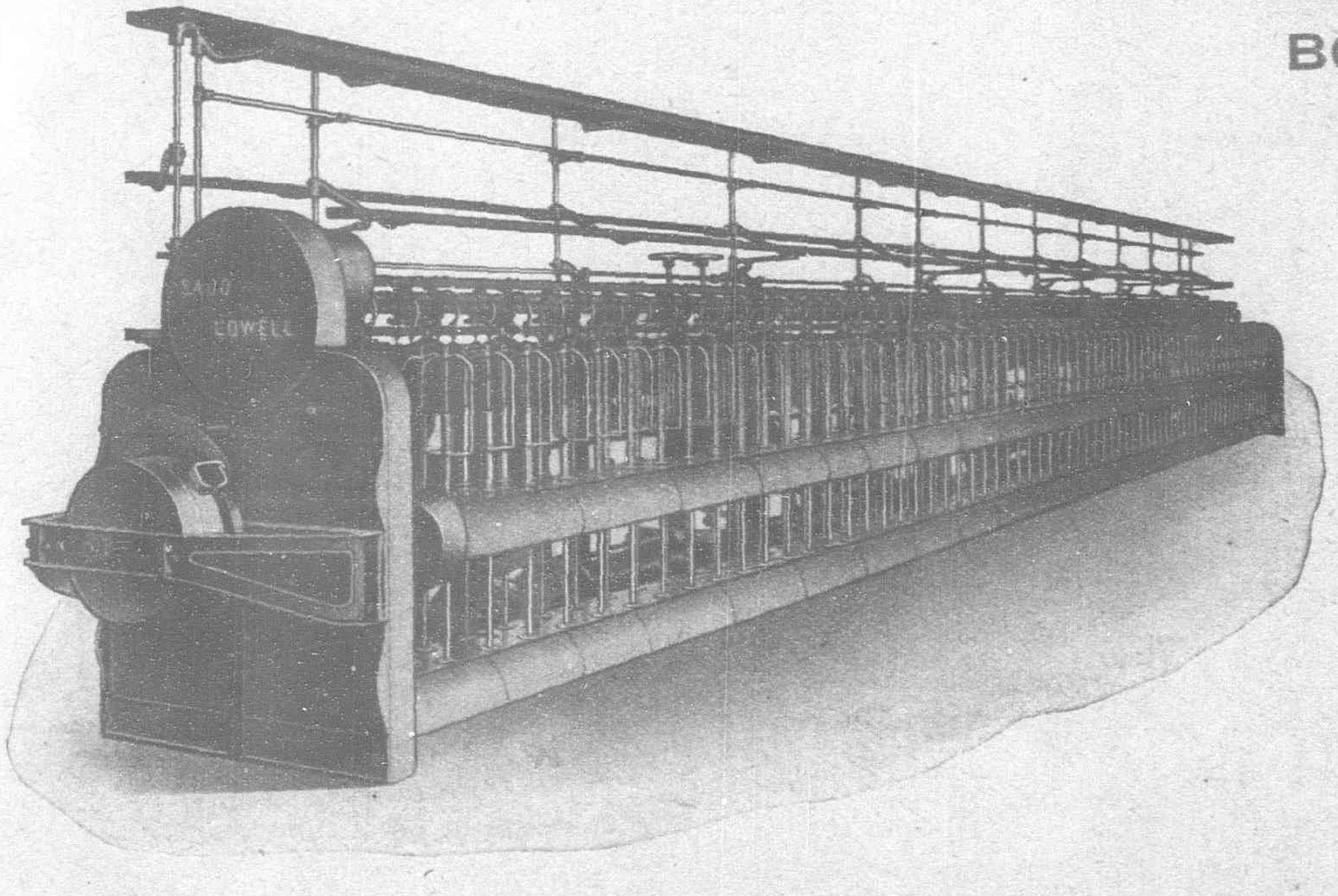

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